THE OPEN SPACE INDEX

NEW YORKERS FOR PARKS

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New Yorkers for Parks is a citywide, independent organization dedicated to ensuring that all New Yorkers enjoy a world-class parks system.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

New Yorkers for Parks (NY4P) is a citywide, independent organization dedicated to ensuring that all New Yorkers enjoy a world class parks system. New Yorkers for Parks achieves its purpose through an integrated framework of advocacy, research, planning and a coalition of parks, open space, recreation, advocacy and civic organizations.

New York City is a place of constant change. During times of economic growth the number of real estate developments and re-zoning projects can seem dizzying, and in an economic downturn land use decisions are of critical importance to such a dense environment. However, unlike cities such as Chicago and London, New York does not have a comprehensive plan for city development and, accordingly, no plan that ensures adequate open space in all neighborhoods. Without sound planning and smart policies guiding development, the City risks the continuing loss of open space and missed opportunities for new open spaces. In a 2007 report, "Making the Most of our Parks," the Citizens Budget Commission observed that New York City parks "must accommodate an unparalleled volume of people … [and that] … New Yorkers must be especially innovative in order to make the most of their parks." The report suggested that one of the greatest challenges to our park system was the lack of a comprehensive, strategic plan guiding its expansion.

In order to encourage comprehensive open space planning, NY4P has developed the "Open Space Index," a set of targets for open space access and environmental sustainability in New York City neighborhoods. The targets are informed by existing New York City open space conditions, current New York City park and sustainability policies, measures in other cities and recommendations from professionals in the fields of real estate, open space planning, environmental justice, community-based planning and environmental science. The Open Space Index will serve as a tool to evaluate neighborhood open space and help communities identify and advocate for their open space priorities. It is NY4P's hope that these neighborhood-level assessments will contribute to thoughtful, community-driven plans for parks and open space in New York City.

Lee Stuart
Executive Director, New Yorkers for Parks
April 8, 2010

INTRODUCTION

Parks provide New Yorkers with space for recreation and play, quiet reflection, connection to nature, social networking and civic engagement. Each community and neighborhood within New York City has open space needs unique to its population's ages, interests and current open space resources. The City must make certain that all neighborhoods have appropriate recreational and open space opportunities to meet these needs. This can only be achieved with a methodologically-sound assessment that identifies the gaps in the open space system and supports the creation of a long-term comprehensive plan to enhance, preserve and promote quality parks.

Given the unique characteristics of New York City's geography and land use, the Open Space Index, shown on page 3, offers a variety of targets, making it flexible enough to be relevant across diverse neighborhoods in all five boroughs. The 15 targets of the Open Space Index fall within four main categories:

- Active and Passive Open Space
- Access and Distance
- Environmental Sustainability
- Park Maintenance

As part of its Neighborhood Parks Services program, NY4P will work with communities to complete Open Space Index assessments. Neighborhoods may not score well on all 15 targets, but the assessment itself will provide the foundation for a community-wide discussion of open space needs. For example, in a dense neighborhood where increasing park acreage is not feasible, neighborhood residents may prioritize improving park maintenance or increasing tree canopy coverage. A community with a large immigrant population from the West Indies or Pakistan may prioritize a cricket field over basketball courts, and a neighborhood with a large number of seniors may prefer passive park spaces with benches over parks comprised of fields and courts.

Boys play cricket on a baseball field in Joseph Austin Playground, Jamaica Hills, Queens.

The Open Space Index

Open Space Elements	Proposed New York City Neighborhood Standards
Active and Passive Open Space	
Active Open Space & Facilities	1 acre/ 1,000 residents
Playgrounds	1 Playground/ 1,250 children
Athletic Fields	1.5 Athletic Fields/ 10,000 residents
Courts	5 Courts/ 10,000 residents
Recreation Centers	1 Recreation Center/ 20,000 residents
Passive Open Space	1.5 acres/ 1,000 residents
Community Gardens	1 Community Garden/ 10,000 residents
Total Acres of Open Space	2.5 acres of Open Space/ 1,000 residents
Access and Distance	
Walking Distance to a Pocket Park (Less than 1 acre)	100% of residents are within a 5 minute walk (1/4 mile)
Walking Distance to a Neighborhood Park (1-20 acres)	100% of residents are within a 5 minute walk (1/4 mile)
Walking Distance to a Large Park (20+ acres)	100% of residents are within a 10 minute walk (1/2 mile)
Environmental Sustainability	
Urban Tree Canopy Cover	Neighborhood-specific goals are provided in Appendix D
Permeable Surfacing within Parks	70%
Park Maintenance	
Parks rated overall "acceptable" by DPR	85%
Parks rated "acceptable" on cleanliness by DPR	90%

Why does the City need a Master Plan for Parks?

Because New York does not have a Master Plan for open space, there is no comprehensive lens through which we can ensure that all neighborhoods have adequate park space. A Master Plan, informed by neighborhood-level open space assessments, would provide an array of measures and goals, which would hold city agencies, elected officials and developers accountable, ensure equitable park access across the city and provide transparency to communities that desire to understand and improve the open space options in their neighborhoods.

There are numerous environmental, health, economic and lifestyle reasons why open space provision should be a priority for New York City. In light of our expanding population and the growing threat of climate change, a comprehensive plan for open space and sustainability is essential.

Population Growth

New York City's population is expected to increase by over one million residents by 2030.[1] This extraordinary growth will affect a number of city services, including the already strained parks system. Launched in 2007, the Bloomberg administration's PlaNYC initiative offers a broad approach to accommodate the expected population increase, while also improving the City's long-term environmental sustainability. One major goal of this plan is to ensure that all New Yorkers are within a 10 minute walk of a park. Strategies toward achieving this goal include the creation of new public plazas and opening schoolyards to the public in neighborhoods lacking in open space. These policies have been incorporated into the Open Space Index.

PlaNYC has introduced a number of progressive programs that take a wide-range view of the city's environmental sustainability. It does not, however, offer a neighborhood-by-neighborhood assessment with community input. The Open Space Index is a logical and meaningful next step for PlaNYC because it offers a menu of targets that individual communities can apply to their neighborhood.

CEQR IS NOT ENOUGH

New York City has guidelines for reviewing the environmental impacts of large-scale 'actions', such as infrastructure projects, rezonings and real estate developments. They are outlined in the City Environmental Quality Review (CEQR) Technical Manual.

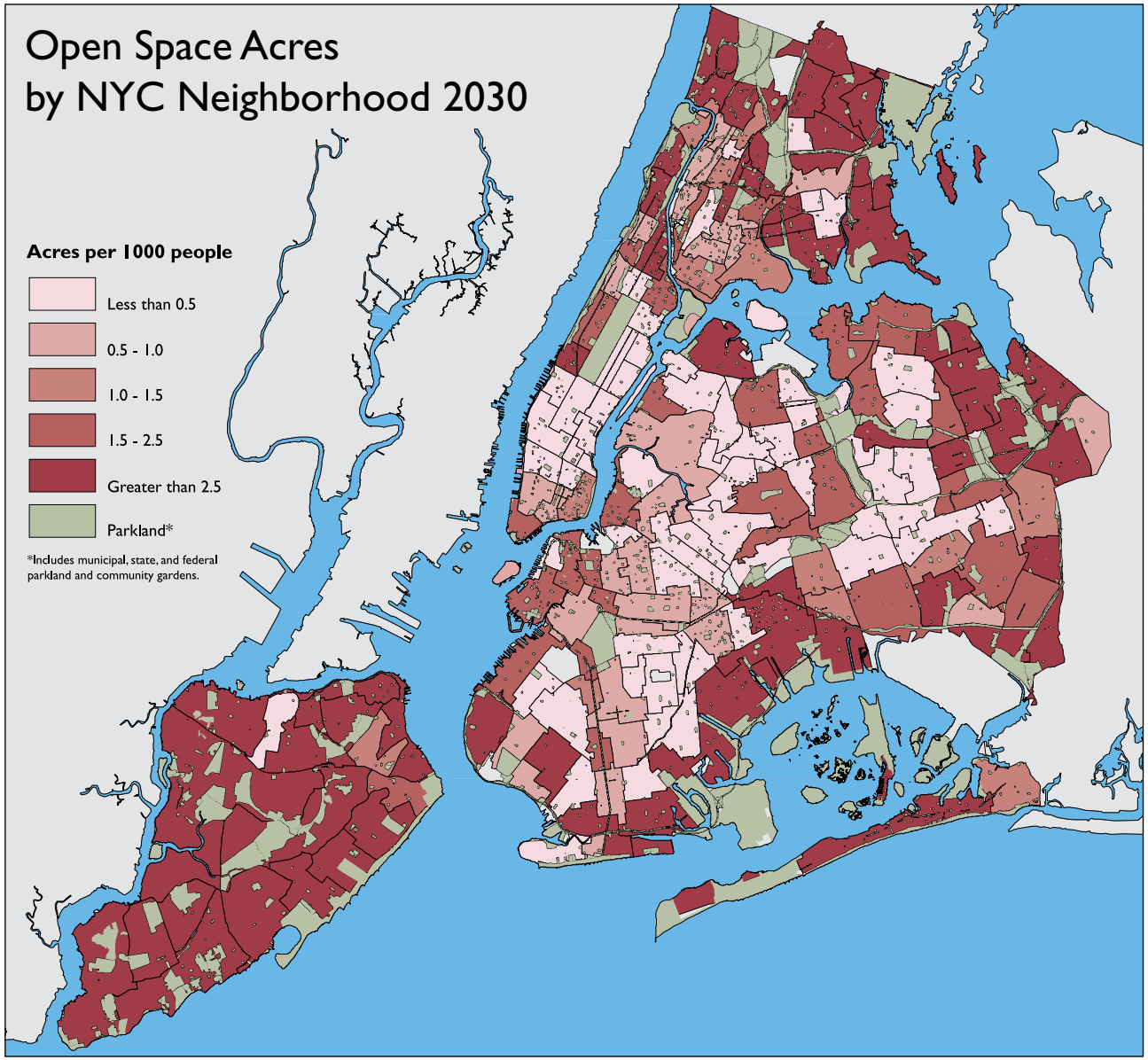
Many of the projects reviewed by CEQR result in substantial population increases, yet little regard is given to the new population's open space needs. The City's open space goal of 2.5 acres of open space per 1,000 residents, detailed in CEQR, is characterized as a "benchmark that represents an area well-served by open space", not an "impact threshold" that must be achieved. This weak language and lack of enforcement often results in developments that do not provide adequate open space opportunities to residents.

PROVIDING OPEN SPACE TO THE 2030 POPULATION

With the help of the Department of City Planning (DCP), New Yorkers for Parks calculated the projected open space provision for each NYC neighborhood in 2030. Using the neighborhood boundaries set forth by PlaNYC and population projections provided by the DCP's Population Division, NY4P estimated the open space ratios (# acres/1,000 people) that can be expected in the year 2030.[2] The findings are contained in the map at right.

The map illustrates the range of access to parks across the city. Areas colored by the darkest shade of red --in Staten Island and the northern neighborhoods of the Bronx-- have excellent open space provision (more than 2.5 acres per 1000 residents). However, central Brooklyn and Queens, depicted in light pink, are expected to receive large numbers of immigrants over the next two decades and will suffer from inadequate access to open space. Planning for new parks in these neighborhoods now will help the City to accommodate its new residents in the years to come.

It is also important to recognize that some neighborhoods, though near a large park, may not have access to its recreational opportunities. For example, many residents of the neighborhoods surrounding Pelham Bay Park in the Bronx are not within walking distance of that very large park, and interstate highways and exit ramps create physical barriers that further hinder access.



Environmental Sustainability

In addition to providing us with spaces to recreate and interact, our parks are the key to New York's long-term environmental sustainability. Trees, grass and plants provide a variety of environmental benefits to New Yorkers. They absorb air pollution, reduce nearby air temperatures and provide habitats for wildlife. Green spaces slow storm water runoff and naturally filter contaminants before they reach our rivers and bays. Maintaining and expanding these natural areas is essential to New Yorkers' health and well-being today and in the future, particularly in light of the increasing impacts of global climate change. Neighborhood-level open space assessments will help highlight areas in need of improved sustainability features, including parks.

Theodore Roosevelt Park, Upper West Side, Manhattan

Economic Benefits of Parks

Numerous studies have demonstrated that well-maintained parks make neighborhoods more attractive for investment. Parks attract residents and businesses, increase real estate values and draw tourists. A study commissioned by the Central Park Conservancy estimated that Central Park added $17.7 billion to the market value of properties near the park. Additionally, events, enterprises and activities connected to the park generated an estimated $395 million in 2007.[3] In another example, the Regional Plan Association and Friends of Hudson River Park found that an initial $75 million investment in the Greenwich Village section of the Hudson River Park added $200 million in value to the properties in a two block area adjacent to the first completed section of the Park between 2002 and 2005.[4]

This phenomenon is not limited to wealthy neighborhoods in Manhattan. A 2002 study conducted by Ernst and Young, LLP and NY4P, "How Smart Parks Investment Pays its Way," found that strategic investment in revitalizing neighborhood parks yields significant economic returns to the City of New York, investors and neighboring communities.[5] The study found that recent capital investment in Clove Lake Park in Staten Island and St. Albans Park in Queens paralleled improvements in local real estate and the general desirability of the neighborhoods. Further, a study by the Furman Center for Real Estate and Urban Policy estimated that the "gross tax benefits to the city generated by all community gardens over a 20-year period amounts to about $503 million."[6] More comprehensive planning, through open space assessments, will help to identify neighborhoods in need of park expansion or improvement, and enable the City to make strategic investments in high-need areas. The resulting open space improvements, when well-maintained, will positively impact the surrounding communities' economic vitality and may be linked to broader economic revitalization strategies.

Health & the Built Environment

Parks provide spaces for physical activity, and numerous studies have shown that proximity to a park increases the frequency of exercise.[7] Regular exercise contributes to weight loss, increases energy and decreases the risk of hypertension. Time spent outdoors and close to nature can also have a significant impact on mental health, particularly in urban areas where crowded conditions can cause increased levels of stress. Comprehensive planning can help to ensure that recreation opportunities are adequately distributed among all New York City neighborhoods, with a particular focus on those with poor public health outcomes.

Ralph Demarco Park, Astoria, Queens

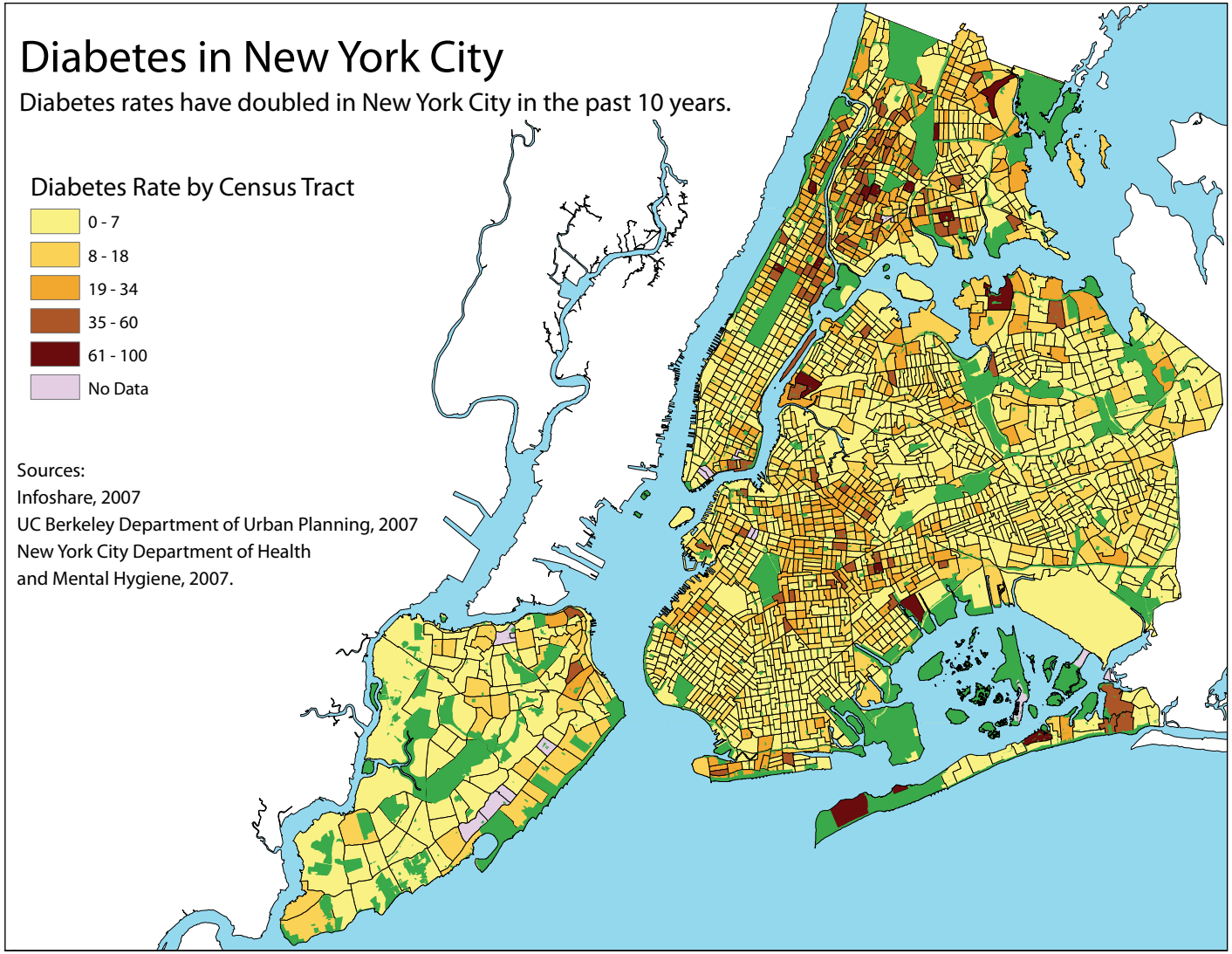
Quality of Life: Enriching Lives and Reducing Crime

Well-kept parks and community gardens have a beautifying and uplifting effect on communities. Open space promotes social interaction and healthy lifestyles by providing much-needed opportunities for physical activity, social interaction and connection to nature. Communities benefitting from vibrant public spaces have more "eyes on the street," which can improve safety. Accordingly, "police departments document sharp declines in juvenile arrests after recreational facilities open in low-income neighborhoods."[8] These benefits should be kept in mind when planning for open space at the neighborhood level.

EQUITY & ENVIRONMENTAL JUSTICE

There are disparities in open space opportunities in many cities, and these disparities often correspond with race and income. A study of open space in Los Angeles found that "children of color disproportionately live in communities of poverty without enough places to play in parks and schools, and neither cars nor an adequate transit system to reach parks and school fields in other neighborhoods."[9] This lack of access to recreation can have serious health implications, and nearby sources of pollution such as industrial sites and highways frequently contribute to these adverse circumstances. High rates of childhood obesity, asthma and diabetes often correspond with fewer acres of open space in urban areas.

New York City is no exception to this trend. The map at right depicts diabetes rates in New York City. This map illustrates the census tracts across the city experiencing the highest rates of diabetes. Notably, many of the areas with the highest rates of diabetes lie in neighborhoods most deficient in parkland. As illustrated on the map, some examples include the South Bronx, East Harlem, Hunters Point in Queens and areas of central Brooklyn. Expanding open space opportunities in these neighborhoods should be closely considered, and an open space assessment using the Open Space Index could help to identify specific ways to improve access in these areas.



PART I: DEVELOPING THE OPEN SPACE INDEX

New Yorkers for Parks' Open Space Index is a blueprint of open space and sustainability targets that will help New York City neighborhoods create open space agendas and help the City to begin planning for open space on a comprehensive level. The Index, shown on page 9, is a product of a three-year research and development endeavor at NY4P. Each target was examined through an analysis of current New York City open space conditions, a wide study of measures in other cities and interviews with experts in the fields of real estate, open space planning, environmental justice, community-based planning and environmental science. In the spring of 2009, NY4P conducted a Pilot Study of the Index in the Lower East Side neighborhood of Manhattan.

The 15 targets that comprise the Index offer a variety of approaches to ascertaining a neighborhood's open space opportunities and environmental sustainability. When applied to a specific neighborhood, it provides a complete picture of the area's open space. As part of its Neighborhood Parks Services program, NY4P will provide leadership and technical assistance to neighborhood groups that petition for an Open Space Index assessment in their community.

How communities can use the Open Space Index:

- assess open space needs
- highlight equity issues
- identify environmental sustainability opportunities
- organize an advocacy campaign

Elected officials can use a neighborhood's completed open space assessment to more effectively target capital spending on park improvements.

NEIGHBORHOOD PARKS SERVICES:

The Open Space Index is envisioned as a part of New Yorkers for Parks' broader Neighborhood Parks Services (NPS) program. NPS is a technical assistance program designed to pair park supporters and community advocates with NY4P's extensive experience in park research, advocacy, planning, beautification and design. The direct services that NY4P provides through the NPS program will educate and empower communities to advocate locally for open space.

As part of NPS, New Yorkers for Parks will work with communities to conduct Open Space Index assessments. NY4P staff will identify all open space sites and compile an inventory of sites to be surveyed. NY4P will coordinate the data collection, which includes all surveying, measuring, calculating and map-making. NY4P will present the completed Open Space Index to neighborhood constituents at a public meeting, and community stakeholders can then shape their advocacy priorities using the results of the Index.

The Open Space Index

Open Space Elements	Proposed New York City Neighborhood Standards
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Scope: The Neighborhood Scale

Acknowledging that New Yorkers live in densely-occupied, shared spaces, the Open Space Index examines parks and environmental sustainability on the smallest stage available: the neighborhood. In thinking about access to open space opportunities, most residents would be more likely to walk to a park within the bounds of a neighborhood, rather than their larger Community Board or Council District. This smaller scale allows for a more feasible and meaningful assessment.

The neighborhood boundaries used for the Open Space Index are consistent with neighborhood boundaries created in conjunction with PlaNYC population projections. While there are 51 Council Districts and 59 Community Boards, there are 188 PlaNYC neighborhoods. Maps illustrating the neighborhood boundaries are provided in Appendix A.

Research

The foundation of NY4P's research for the Open Space Index was an extensive study of open space policies and standards in other cities. As the Index developed, NY4P also drew upon existing NYC open space and sustainability goals and recommendations by third parties such as recreation and environmental advocates. Additionally, a range of park, recreation and environmental groups have published open space goals for American urban areas. While many of these standards are generalized and do not consider New York City's unique population density and geographic constraints, they provided thoughtful groundwork for NY4P's own set of standards. Some key resources that influenced the Open Space Index standards are listed below.

Existing Local Guidelines

Various New York City initiatives and processes informed the Open Space Index. The City Environmental Quality Review (CEQR) Technical Manual, which provides the guidelines for environmental reviews of large projects, includes various benchmarks, including an open space goal of 2.5 acres of open space per 1,000 residents. NY4P has used a version of this goal and CEQR's definition of open space in the Open Space Index. Additionally, PlaNYC's plaza initiative and goal that all residents live within a 10 minute walk of a park influenced the Index's targets. Finally, NY4P borrowed standards for park maintenance from the annual *Mayor's Management Report*.

National Recreation and Parks Association (NRPA)

NRPA is a national advocacy and education organization that provides park and recreation guidelines for cities. These guidelines include ratios for each type of facility in relation to population as well as a minimum service radius (i.e. walking distance) for each type of field and court. For example, NRPA recommends that cities offer a minimum of 1 basketball court per 5,000 residents and, further, it suggests that a basketball court be provided within a 1/4-1/2 mile radius of all residences.[10] Specific goals such as these were very useful in developing the Active Open Space targets for the Open Space Index. While the NRPA standards were designed to serve a variety of urban areas across the United States, NY4P was able to incorporate a number of them into the Index by adapting them to take NYC's extraordinary population into account.

LEED Standards

The United States Green Building Council (USGBC), which administers the Leadership in Energy and Environmental Design (LEED) Green Building Rating System, recently developed a new program called LEED for Neighborhood Development (LEED-ND). Starting in 2010, this new element of the rating system will award LEED points to developments providing a variety of open spaces within walking distance of homes and businesses.[11] This Smart Growth strategy is consistent with LEED's environmental sustainability mission and expands on this objective by encouraging physical activity and time spent outdoors. The LEED-ND walking distance rating influenced the Open Space Index's Access and Distance targets.

Other Cities' Goals

Numerous American cities have open space goals, and outside the United States a number of large metropolises have developed extensive policies as well. Cities such as Austin, Charlotte, Denver, Indianapolis, Nashville and Phoenix incorporate basic park standards into their city planning. Other cities such as Minneapolis, San Diego, Vancouver, London and Ottawa have developed multi-layered, comprehensive open space plans, and Seattle's impressive *Park & Recreation Plan* provides "Distribution Guidelines" for over 29 types of recreational opportunities.[12] When constructing the Open Space Index for New York City, NY4P closely examined these other cities' plans and policies.

BEST PRACTICES IN MUNICIPAL OPEN SPACE PLANNING

LONDON'S Open Space Plan provides a framework of strategies that can be applied to various neighborhoods. By order of the Mayor of London, individual boroughs (i.e. neighborhoods) must develop an Open Space Strategy that considers the supply and demand of open spaces within each community and identifies "ways of protecting, creating and enhancing them." To accompany this strategy, the Mayor published a "Guide to Preparing Open Space Strategies," which offers a variety of methods and strategies for measuring open space access, from which individual boroughs can select the elements that are most relevant to their community. Some guidelines include a 5-minute walk to an area equipped for children's play and a 1/4 mile walk to a small park.[13]

OTTAWA'S Greenspace Master Plan includes a variety of environmental initiatives, including a 30% tree canopy cover, an ambitious greenspace target of 10 acres for every 1000 residents and a mandate that every resident be within a 1/4 mile walk of a green space.[14] This plan, developed in 2005 and 2006, is a notable precursor to New York City's PlaNYC.

SAN FRANCISCO has undertaken an expansive project to assess and expand its open space network in an equitable and environmentally sustainable manner. The San Francisco Planning Department is creating an Open Space Framework intended to guide the city towards a comprehensive open space network.[15] The new plan will include goals regarding increasing the amount of open space in the city and providing a balanced recreation system offering a range of both active and passive recreation opportunities.[16]

Advisory Interviews

A critical component of our preliminary research was feedback gathered from New York City planning, development and environmental advocacy leaders. NY4P staff interviewed 20 professionals ranging in background from real estate and open space planning to environmental justice, community-based planning and environmental science. Each meeting included a review of the Open Space Index, and these discussions helped us modify the indicators further and explore strategies for codifying the Open Space Index into legislation or environmental regulations. NY4P interviewed experts from the Pratt Institute, Hunter College, the Manhattan Borough President's office, the Department of Parks and Recreation (DPR), Department of City Planning, Regional Plan Association, New York Lawyers for the Public Interest, WeAct for Environmental Justice, Jonathan Rose Companies, Related Companies, Landmark West!, and more. For a complete list of interviewees, see Appendix B.

Pilot Study

The final element of research that informed the Open Space Index was the Pilot Study that NY4P conducted in the Lower East Side neighborhood of Manhattan in the Spring of 2009. This community was chosen because of its rich demographic diversity, variety of open spaces and vibrant history of park and garden advocacy. With a near-final version of the 15 targets, NY4P employed the methodology it developed for the Index to assess the neighborhood's open space opportunities. The Pilot Study was an excellent opportunity to test the methodology and address lingering questions on specific open space elements. The Pilot Study culminated with a Community Meeting in the neighborhood, and this report benefited significantly from the feedback received from local residents who attended the meeting. Results of the Pilot Study are discussed further in Part III.

PART II: THE OPEN SPACE INDEX

New York City contains an astonishing diversity of built environments. Comparing open space elements in midtown Manhattan to park characteristics in Far Rockaway can seem like comparing apples to oranges. A neighborhood's demographic composition gives it a specific set of needs, and its geographical location provides a unique set of constraints and opportunities. However, the City needs a tool that can be both consistent and flexible in setting standards for neighborhood open space. The Open Space Index was designed with this in mind.

Understanding that each neighborhood has distinct needs, the Open Space Index does not weight the importance of the various indicators.[17] It is our hope that communities using the Index will prioritize the targets based on community input and the constraints and opportunities provided by their neighborhood's particular geography.

The elements that comprise the Open Space Index provide a flexible framework, because open space can be measured in a variety of ways. For example, acreage per capita is a common approach, but this measurement does not always capture residents' ease of access to open spaces. While Flushing Meadows Park in Queens offers over 1,250 acres of open space, residents of the nearby Jackson Heights neighborhood live between a 20 and 30 minute walk away from this large park. In order to capture a situation like this one, the Open Space Index examines acreage per capita in concert with physical distances to open spaces, so that communities can obtain a much clearer picture of their open space strengths and weaknesses.

Background, Methodology and Data Collection

The following sections address each Open Space Index target individually and provide information explaining:

- the definition of the open space element
- the background research influencing the target
- the methodology behind collecting data on the element
- the process for calculating a neighborhood's outcome

All targets that incorporate resident and child population use Census 2000 data.

WHAT IS OPEN SPACE?

City Environmental Quality Review (CEQR), the procedure that guides the environmental review process in New York City, defines open space as "publicly or privately-owned land that is publicly accessible and has been designated for leisure, play, or sport, or land set aside for the protection and/or enhancement of the natural environment."[18] In addition to City, State and Federal parkland, this includes any publicly accessible community gardens and plazas. The Open Space Index remains faithful to this definition.

Active Open Space

Open Space Elements	NY4P Neighborhood Standards
Active Open Space & Facilities	1 acre/ 1,000 residents
Playgrounds	1 Playground/ 1,250 children
Athletic Fields	1.5 Athletic Fields/ 10,000 residents
Courts	5 Courts/ 10,000 residents
Recreation Centers	1 Recreation Center/ 20,000 residents

Active Open Space facilities offer places for recreational sports, exercise and play. This type of parkland is critical to maintaining good mental and physical health. A variety of recreational opportunities is essential for any neighborhood, and each community will have unique demographics that will inform their recreational needs. Playgrounds provide young children with areas to develop motor skills and engage with peers. Athletic courts and fields allow for organized games that encourage physical engagement, exercise and socialization. Recreation Centers offer athletic and educational programming that is particularly important in winter months when outdoor fields and courts are unavailable.

The following park elements are categorized as Active Open Space on the Open Space Index: playgrounds, fields and rinks, courts, pools, beaches, golf courses, greenways, bikeways and recreation centers.[20] Recognizing the need for a variety of active recreation opportunities, the Active Open Space section of the Index contains four sub-categories --playgrounds, fields, courts and recreation centers-- each of which are critical to a neighborhood with adequate recreational opportunities. Though each of these sub-categories contributes to the Active Open Space total, it is useful to break them out because of their common presence throughout the city.

Maria Hernandez Park, Bushwick, Brooklyn

NEW YORK CITY'S CEQR TECHNICAL MANUAL DEFINES ACTIVE OPEN SPACE AS

"open space that is used for sports, exercise, or active play… consist[ing] mainly of recreational facilities, including the following: playground equipment, playing fields…, playing courts…, beach area…, pools, ice skating rinks, greenways and esplanades…., multipurpose play area (open lawns and paved areas for active recreation…), and golf courses."[19]

Brower Park, Crown Heights, Brooklyn

Linden Playground, East New York, Brooklyn

Collecting Data

Calculating a neighborhood's active open space acreage requires obtaining measurements of the play areas, courts, fields, swimming pools, beaches, golf courses, greenways, bikeways and recreation centers. Surveyors, led by NY4P staff, employ a variety of methods to obtain this data. Most courts, fields and pools follow national size standards (listed in Appendix C); however, occasionally these elements will not be of standard size. When a court, field or pool is shaped irregularly, surveyors use a measuring wheel to measure the areas. A measuring wheel must also be used to calculate the area of play areas throughout the city. In the case of beaches, greenways, bikeways, golf courses and recreation centers, the Parks Department will often be able to provide the acreage. However, when a measurement is not available, these features must be measured manually as well. The Open Space Index Technical Manual contains further details on the methodology used to calculate a neighborhood's active open space acreage.

NY4P staff measuring a play area in Seward Park, Lower East Side, Manhattan

Playgrounds

Open Space Element	NY4P Neighborhood Standard
Playgrounds	1 Playground/ 1,250 children

Playgrounds provide children with opportunities to climb, bounce, swing, build strength, increase coordination, take risks and interact with their peers. Some cities' open space plans approach playgrounds through an accessibility lens: Seattle's Parks and Recreation Plan sets a standard of a 1/2 mile walking distance to playground[21] while London[22] and San Francisco[23] recommend that all residents be within a 1/4 mile walk to a children's playground. The Open Space Index sets a goal of 1 playground per 1,250 children. This target takes New York's density into account and is consistent with PlaNYC's playground standard. [24]

The Index defines a playground as a portion of a park consisting of play equipment, such as swings and structures for climbing, the boundaries of which are delineated by required safety surfacing.

Safety surfacing in a playground at Seward Park, Lower East Side, Manhattan

Collecting Data

Collecting data on playgrounds requires surveying neighborhood parks on foot. Surveyors, led by NY4P staff, visit all parks and playgrounds in the study area to identify play equipment. For the purposes of the Open Space Index, play equipment situated within a contiguous section of safety surfacing equals one playground. Most New York City public playgrounds are operated by DPR, however, neighborhoods with PlaNYC Schoolyard-to-Playground sites and NYCHA playgrounds that are open to the public may include these sites in this measurement as well.

ADDITIONAL PLAYGROUNDS

Schoolyards-to-Playgrounds

In 2007, Mayor Bloomberg launched the Schoolyards-to-Playgrounds program in conjunction with PlaNYC. Under this initiative, schoolyards that were previously locked during non-school hours, on weekends and over the summer are opened to the public during non-school hours.[25] So far, this program has opened 112 schoolyards and will open 154 more in the coming years.[26] Because of the critical service that these playgrounds provide, these sites are included in the Open Space Index's assessment of a neighborhood's playgrounds.

NYCHA playgrounds

Public housing sites across the City frequently have playgrounds located within their grounds. These playgrounds are operated by the New York City Housing Authority (NYCHA) and are not always accessible from outside of the housing complex. Due to their semi-private nature, New Yorkers for Parks did not include them in the playground count for our Pilot Study.

Noble Playground, West Farms, Bronx.

Athletic Fields

Open Space Element	NY4P Neighborhood Standard
Athletic Fields	1.5 Athletic Fields/ 10,000 residents

Organized field sports provide positive health and social benefits to both children and adults. Team sports teach young people problem-solving, conflict-resolution, and sportsmanship skills. For adults, field sports offer occasions for socializing and exercising. The NRPA provides the following athletic field recommendations:

- 1 baseball field per 5,000 residents
- 1 soccer field per 10,000 residents
- 1 football field per 20,000 residents[27]

To simplify these standards, NY4P consolidated the various types of playing fields into one element on the Open Space Index. This target is 1.5 athletic fields per 10,000 residents, a hybrid of NRPA's national urban standards. Fields include soccer, football, cricket, baseball and hockey fields, as well as ice hockey rinks. Condensing the various types of athletic fields into one generalized target on the Index provides flexibility for neighborhoods with a variety of sporting interests. The specific types of fields offered in each neighborhood should be examined through the lens of residents' preferences.

Collecting Data

Collecting athletic field data requires surveying neighborhoods parks on foot. While DPR's website often includes fields on its park maps, sometimes the information is incomplete. Led by NY4P staff, surveyors visit all parks in the study area to confirm the number and type of fields available. In situations where fields overlap one another, surveyors defer to the maximum number of fields by recording the number of fields that can be used simultaneously. For instance, if two baseball fields are drawn atop a soccer field, the area is counted as two fields.

Soccer field in Riverside Park, Morningside Heights, Manhattan

Baseball field in Roberto Clemente Ballfield, Williamsburg, Brooklyn

Courts

Open Space Element	NY4P Neighborhood Standard
Courts	5 Courts/ 10,000 residents

Much like fields, courts host organized athletic games that contribute to the physical and social development of children and healthy lifestyles of adults. NRPA offers the following court recommendations for urban areas:

- 1 basketball court per 5,000 residents
- 1 handball court per 20,000 residents
- 1 volleyball court per 5,000 residents
- 1 tennis court per 2,000 residents[28]

To simplify these standards and allow for flexibility within communities, NY4P consolidated the various types of courts into one court target on the Open Space Index. The standard, 5 courts per 10,000 residents, considers NRPA's national urban standards, New York's density, and the changing sporting tastes of New York residents. Condensing the various court types into one target allows unique neighborhoods a measure of flexibility when assessing their court needs and acknowledges the variety of sporting interests among New York residents.

Collecting Data

Collecting data on courts also requires surveying neighborhoods parks on foot. While DPR's website often includes courts on its park maps, sometimes the information is incomplete. Surveyors, led by NY4P staff, visit all parks in the study area to confirm the number and types of courts available. All tennis, basketball, volleyball, handball and bocce courts are counted toward this total. When half-basketball courts are identified, they are counted as 1/2 of a court.

Coffey Park, Red Hook, Brooklyn

Handball in Russell Pederson Playground, Bay Ridge, Brooklyn

Recreation Centers

Open Space Element	NY4P Neighborhood Standard
Recreation Centers	1 Recreation Center/ 20,000 residents

The Parks Department operates 50 Recreation Centers throughout New York City. These indoor facilities offer a variety of athletic and educational programming for all ages. They are particularly critical in winter months when outdoor fields and courts are unavailable. Many neighborhoods also benefit from YMCAs and other community centers run by non-profits and other agencies. If these places offer recreational opportunities, are publicly accessible and charge comparable fees to DPR Recreation Centers, they may be considered in a neighborhood's Recreation Center count.[29] The Open Space Index recommends one Recreation Center per 20,000 residents.[30] This goal reflects the need for indoor recreation opportunities, particularly during colder periods of the year.

Collecting Data

Data on Recreation Centers can come from a variety of sources. DPR lists its Recreation Center locations on the DPR website.[31] Surveyors, led by NY4P staff, identify community centers run by non-profits, NYCHA and other agencies through field work and in consultation with local stakeholders. If these sites offer recreational opportunities and are publicly accessible, they may be considered in the neighborhood's Recreation Center count.

Hamilton Fish Play Center, Hamilton Fish Playground, Lower East Side, Manhattan


The Golden Age Center for Senior Citizens, Sara D. Roosevelt Park, Chinatown, Manhattan

Passive Open Space

Open Space Element	NY4P Neighborhood Standard
Passive Open Space	1.5 acres/ 1,000 residents

Passive open spaces such as lawns, esplanades, plazas, beaches, natural areas and community gardens offer places to relax, stroll, socialize and experience nature.[32] These spaces provide respite from the chaos of the City and give residents much-needed interaction with the natural environment. Tranquil open spaces are particularly important to vulnerable populations, such as the ill, disabled and elderly, who are potentially less likely to participate in active recreation but stand to benefit immensely from the outdoors.

Collecting Data

Passive open space acreage is calculated using a number of sources and methods. Maps obtained from DPR, Council on the Environment on New York City (CENYC) and NYC Audubon provide data for parks, beaches, community gardens and natural areas. NY4P staff uses GIS (Geographic Information Systems) mapping software to calculate the acreage of community gardens, natural areas, beaches and parks. For large parks that are primarily passive but contain some active recreation, NY4P subtracts the active space acreage from the total park acreage to obtain the passive open space acreage. For neighborhood parks that tend to be occupied primarily by active open space, NY4P calculates the passive acreage by measuring lawns, esplanades, planted areas and other passive spaces within parks using a measuring wheel. Often these spaces are permeable and the measurements can also be used for the permeable surfaces element of the Index. Information on the plazas that resulted from the City's incentive zoning program (see page 12 for details) are obtained from the Department of City Planning's website.[33] The locations of PlaNYC's Plaza Program are obtained from the Department of Transportation's website.[34]

THE ELDERLY POPULATION

Currently, one million New Yorkers are 65 or older.[35] Population projections estimate that the elderly population of New York City is expected to increase by 44% by 2030.[36] This could result in an increase in the demand for passive open space over the next decade.

A lawn in Franz Sigel Park, Concourse, Bronx

Chess players in Carl Schurz Park, Yorkville, Manhattan

NATURAL AREAS

Natural Areas are spaces that retain some degree of wilderness, native ecosystems and ecosystem processes.[37] These estuaries, forests, wetlands and ponds provide habitats to thousands of bird, fish, animal and plant species, and their absorptive quality helps to decrease air pollution and filter urban runoff in New York's waterways.[38] The City's 12,000 acres of natural areas are concentrated in a handful of neighborhoods, and it would be very challenging to create new natural areas in the City's more densely-settled land. For these reasons, there is no specific neighborhood goal for natural areas on the Open Space Index. However, because of the vital role that natural areas play in the City's environmental sustainability, they should be closely considered. Some existing natural areas can be expanded, and communities should push to have them included in future park sites, both along the waterfront and upland. NY4P strongly recommends that under no circumstances should natural area acreage be lost.

Eibs Pond, Park Hill, Staten Island

PLAZAS

Public plazas can provide critical open space in high-density neighborhoods where parks are scarce. They are often located in commercial areas, where they offer respite to workers in need of an office break. An incentive zoning program established in New York City in the 1960s allowed private developers to avoid certain height and bulk restrictions in return for including public plazas in the development. The zoning resulted in more than 80 acres of new public space in the 10 high-density neighborhoods where it was used. Some spaces that were particularly well-designed or boasted an amenity drew users, but many failed to attract the public.[39] Due to mixed results, the program was curtailed; however, a new PlaNYC plaza initiative is being led by the Department of Transportation. This program converts underused streets in neighborhoods lacking open space into plazas. In the program's first phase, nine locations were selected for conversion.

Because of the limited scope of these two programs, few neighborhoods have public plazas. Accordingly, this element is not included on the Open Space Index; however, the open space that plazas provide in high-density areas is significant and should be considered when assessing neighborhoods that have them.

Community Gardens

Open Space Element	NY4P Neighborhood Standard
Community Gardens	1 Community Garden/ 10,000 residents

Community gardens add enormous value to neighborhoods. Their plant growth and permeable surfacing provide environmental benefits; the food harvested within some of them offers low-cost healthy food options to residents; and opportunities for community-building contribute toward social cohesion and a sense of neighborhood pride. In many instances, New York's community gardens have developed on slices of land that were previously vacant. Community groups and residents have transformed the abandoned sites into vibrant centers for farming, learning and socializing. Many gardens offer health, educational and cultural programming, and studies have shown that the gardens successfully reduce neighborhood crime.[40]

A study by the Furman Center for Real Estate and Urban Policy found that community gardens have positive impacts on residential real estate values within 1,000 feet of the gardens. Furthermore, the study also found that gardens have the greatest impact in the most disadvantaged neighborhoods.[41]

As the benefits of community gardens become more widely recognized, cities across America have begun to implement policies encouraging their development and preservation. Boston created a community garden sub-district within its protected open space zoning. Berkley's General Plan recognizes and encourages community gardens as a high-priority use of open space,[42] and Seattle's General Plan calls for one garden per 2,500 households. In 2000, Seattle's City Council passed legislation stipulating that the city develop at least four new community gardens per year, with emphasis given to the City's higher density areas.[43] The Open Space Index sets a goal of 1 community garden per every 10,000 neighborhood residents. This is most closely related to Seattle's household goal, and it is an ambitious yet attainable goal for most neighborhoods.

Generation X Community Garden, Lower East Side, Manhattan


9th Street Community Garden, East Village, Manhattan

Collecting Data

Community Gardens in New York City are owned and operated by a variety of entities including DPR, the Trust for Public Land, the New York Restoration Project and others. NY4P obtains Community Garden data from DPR and Council on the Environment of New York City (CENYC). Surveyors, led by NY4P staff, visit the location of each site to confirm the data.

Two Coves Community Garden, Goodwill Park, Astoria, Queens

Total Acres of Open Space

Open Space Elements	NY4P Neighborhood Standards
Active Open Space	1 acre/ 1,000 residents
Passive Open Space	1.5 acres/ 1,000 residents
Total Open Space	**2.5 acres of Open Space/ 1,000 residents**

All of the categories detailed thus far contribute to the total amount of open space. Total open space will always be an aggregate of the active and passive open spaces in any neighborhood. The CEQR Technical Manual provides the following open space goal for New York City: 2.5 acres of open space per 1,000 people. [44] Despite distinctions from CEQR's passive and active open space definitions, the Open Space Index utilizes CEQR's overall open space goal.

Access and Distance

In densely populated urban areas, the distribution and accessibility of open space is critically important. Many New York City residents do not own cars, and a variety of open space activities should be within walking distance of every resident. While each borough has thousands of acres of parkland, most of it is concentrated in a few very large parks such as Pelham Bay Park in the Bronx, Flushing Meadows Park in Queens and Prospect Park in Brooklyn. Residents not living in the immediate area of these large parks are not likely to utilize the spaces with frequency. Even in areas where residents are within walking distance of an open space, high population density can stress the capacity of the parks. This is why the Open Space Index takes both open space acreage per resident and distance to a park into account.

Open Space Elements	NY4P Neighborhood Standards
Access and Distance	
Walking Distance to a Pocket Park (Less than 1 acre)	100% of residents are within a 5 minute walk (1/4 mile)
Walking Distance to a Neighborhood Park (1-20 acres)	100% of residents are within a 5 minute walk (1/4 mile)
Walking Distance to a Large Park (20+ acres)	100% of residents are within a 10 minute walk (1/2 mile)

Studies indicate that most people are willing to walk 1/2 mile to access community services, which is roughly a 10 minute walk for a healthy adult.[45] In developing accessibility standards for the Open Space Index, NY4P considered NRPA guidelines as well as standards enacted in various cities with open space frameworks. These are listed in the tables at right. Other accessibility references include PlaNYC's call for every New Yorker to be within a 10 minute walk of a park by 2030 and the LEED-ND credit awarded to neighborhoods that are designed to ensure that 90% of residents live within a 1/4 mile of an open space.[46]

To evaluate walking distance in New York City neighborhoods, the Open Space Index breaks parks into three categories based on size.

Pocket Parks

- Measuring less than an acre, Pocket Parks usually accommodate one or two features such as a playground, a court, or a passive sitting area. Their small size limits the services that they can provide to a community, yet they are critical amenities for residents without much mobility such as small children, young mothers, the elderly and infirm. Pocket Parks can also be particularly useful in commercial neighborhoods where workers need respite from the office environment. Given the physical limitations of these groups, the Open Space Index recommends that a Pocket Park be located within a 1/4 mile of all New Yorkers.

National Recreation & Parks Association Accessibility Guidelines	
Park Size	**Service Area Guideline**
Maximum walking distance to a park < 1 acre	1/4 mile
Maximum walking distance to a park > 15 acres	1/4 - 1/2 mile
Maximum walking distance to a park > 25 acres	1-2 miles

City	Accessibility Standard
Ottawa	all residents should be within a 1/4 mile walk of a green space[47]
Seattle	all residents be within 1/2 mile to a usable open space[48]
San Francisco	all residents should be within 1/2 mile to a park and 1/4 mile to a playground[49]

Neighborhood Parks

- Between 1 and 20 acres, Neighborhood Parks typically offer a broad range of recreational opportunities that are essential to New Yorkers' health and well-being. These spaces should be easily accessible to all residents. The Open Space Index recommends that all residents be within a 1/4 mile of a Neighborhood Park.

Large Parks

- The expansive acreage of Large Parks allows for the widest range of recreational activities as well as space for more distinctive features such as beaches, golf courses, natural areas and greenways. Also, Large Parks play important environmental roles, as they are most likely to provide substantial tree habitat and natural, permeable ground surfacing. The Open Space Index recommends that all residents be within a 1/2 mile walk of a Large Park. The map at right illustrates access to Large Parks across New York City.

Understanding that the creation of new Large Parks inside of New York City is quite rare, areas deficient in access to Large Parks might focus their attention on the expansion or improvement of Pocket and Neighborhood Parks.

Collecting Data

NY4P measures access to parks by using GIS mapping software. This tool allows NY4P to calculate walking distances to parks by drawing 1/4 and 1/2 mile radius circles, or "buffers", around each park. The map at right is a simple illustration of 1/2 mile walking distances around Large Parks. However, it is important to note that some physical barriers such as railroad tracks, a body of water, a highway, or a superblock can severely impact accessibility by increasing the walking distance necessary to circumvent the obstacle. These types of barriers should be taken into account when calculating walking distances. Identifying significant physical barriers requires surveying neighborhoods parks on foot and manually measuring the amount of time required to walk around them. This information serves as a supplement to the GIS walking distance buffers.

Environmental Sustainability: Tree Canopy and Permeable Surfaces

In addition to providing us with spaces to recreate and interact, our parks are critical to New York's long-term environmental sustainability. Trees, grass and plants absorb air pollution, provide habitats for wildlife and reduce air temperatures.[50] Natural ground surfacing slows stormwater runoff and provides a natural filter to contaminants before they reach our rivers and bays. The Open Space Index includes Tree Canopy and Permeable Surfacing goals for each neighborhood. Increasing the tree canopy and expanding the area of natural and planted areas within parks are proven ways to combat air pollution, the urban heat island effect and stormwater runoff implications.

Tree canopy in John Golden Park, Bayside, Queens

Tree Canopy

Open Space Element	NY4P Neighborhood Standard
Urban Tree Canopy Cover	Neighborhood-specific goals are provided in Appendix D

The urban forest provides both aesthetic and environmental services to New York City. Trees enhance the park experience not only with their beauty, but also with the shade that they produce and the connection to nature that they provide to urban dwellers. Environmentally, they provide multiple ecosystem services: they remove pollutants from the air, their leaves absorb and store carbon dioxide (the most prevalent greenhouse gas), they cool the air, and the permeable ground in which they grow helps to absorb and manage stormwater runoff. These services are natural solutions that can save the City millions of dollars in annual pollution control, such as wastewater treatment.[51] With this knowledge, a number of cities have established specific urban tree canopy goals. The table at bottom right lists some US cities with notable tree canopy goals.

At the request of DPR, the United States Forest Service completed an analysis of the urban tree canopy in New York City in 2006. Using GIS data and aerial photography, the Forest Service calculated New York City's current Urban Tree Canopy (UTC) at 24%. By identifying all land not covered by water, roads or buildings as possible planting locations, the study estimated that New York City's UTC could be expanded to 42%.[59] In light of these findings, the City initiated the Million Trees NYC program, which is facilitating the planting of one million trees with an ultimate goal of achieving a 30% tree canopy by 2030.

As part of the 2006 citywide report, the Forest Service also calculated the existing and potential tree canopies for each individual New York City neighborhood. The study found that the existing tree canopy in Midtown Manhattan is 1%, yet the neighborhood potential is 20% coverage if trees were planted in all available areas. In stark contrast, the study found that some neighborhoods in Staten Island have tree canopy potentials of up to 53%. The report reveals that all 188 New York City neighborhoods have the potential to increase their tree canopy coverage.

Collecting Data

The Open Space Index uses the neighborhood-level tree canopies published in the Forest Service's 2006 report to provide each neighborhood with an existing tree canopy and a target. [60] A comprehensive list of existing and potential NYC neighborhood tree canopies is located in Appendix D.

Jackie Robinson Park, Harlem, Manhattan

City	Urban Tree Canopy Goal
Annapolis	50% by 2030[52]
Baltimore	40% by 2037[53]
Boston	35% by 2020[54]
Los Angeles	27%, no date set[55]
Roanoke, VA	40% by 2013[56]
Seattle	30% by 2037[57]
Vancouver	28%, no date set[58]

Permeable Surfacing

Open Space Element	NY4P Neighborhood Standard
Permeable Surfacing within Parks	70%

Many parks throughout the city benefit from lush natural areas such as forests, marshes and ponds. Others offer grassy lawns, gardens and shade trees. While many sports --basketball, handball and tennis-- require a hard surface, too many neighborhood parks in the city consist of nothing more than a concrete slab.

Integrating more plant life and green space into these areas would make the spaces more enjoyable for park users and provide a number of environmental benefits. First, when rainwater flows off paved surfaces, it picks up contaminants that are then carried through the cities' over-taxed wastewater treatment process. But when the runoff encounters a natural surface, the soil and vegetation filters out some of the pollutants.

Permeable surfacing can also reduce the volume of stormwater runoff as soil absorbs some moisture. Most importantly, soil and vegetation slow the speed of the runoff by providing a physical barrier. This is particularly important in New York City because the sewer and stormwater infrastructure is shared. Heavy rainfall regularly overwhelms the sewer system, causing raw sewage to overflow into waterways and sometimes streets. According to Riverkeeper, New York Harbor receives 27 billion gallons of raw sewage and polluted stormwater discharge from combined sewage overflows each year.[61] While new designs for improved stormwater capture, such as permeable pavement and tree pits that maximize water capture, can be a part of the solution, increasing permeable surfacing remains the most effective way to slow runoff.

The Open Space Index offers a standard of 70% permeable surfacing in parks. Because NY4P's research yielded no existing examples of permeable surface standards, the Index's 70% goal is based on extensive field work and analysis. As with the other Open Space Index indicators, this target does not apply to single parks, but rather to a collection of neighborhood parks. For instance, in a small park filled with active recreation opportunities such as basketball and handball courts, 70% permeability would not be feasible. Yet in natural areas, up to 100% of the land is permeable, and in a large park with substantial passive areas, 80-90% can be attained. As long as a neighborhood has a variety of park sizes and types, an overall rate of 70% permeable surface can be attained.

Planted area in Hero Park, Silver Lake, Staten Island

Cement bordering a play area in Little Flower Playground, Lower East Side, Manhattan

Fulton Park, Bedford-Stuyvesant, Brooklyn

Collecting Data

NY4P collects permeable surfacing data by surveying neighborhoods parks on foot and identifying all tree pits, natural areas, planted green areas, community gardens, natural grass fields, artificial turf fields and other porous surfaces within the parks.[62] In parks that are primarily concrete, surveyors measure each individual permeable space with a measuring wheel. In parks with large swaths of natural surfacing, it is more efficient to measure the impermeable surfaces and subtract them from the park's overall acreage to find the permeable surfacing acreage for that park.

A hard-surface baseball field in Betsy Head Memorial Playground, Brownsville, Brooklyn

Lawn and plantings in John Paul Jones Park, Fort Hamilton, Brooklyn

Park Maintenance

Open Space Elements	NY4P Neighborhood Standards
Parks rated overall acceptable by DPR	85%
Parks rated acceptable on cleanliness by DPR	90%

New York City's parks serve as front and backyards for many New Yorkers. Keeping parks clean, well-kept and safe is essential to visitors' comfort within them. Therefore, investing in park maintenance has a positive effect on park use and neighborhood safety.

The Parks Inspection Program (PIP) is DPR's method of tracking park maintenance, and it rates parks "acceptable" or "unacceptable" based upon the condition of specific park features. Each site receives ratings in two categories, Cleanliness and Overall Condition. Cleanliness is determined by five factors: litter, broken glass, graffiti, ice and weeds. Overall Condition is determined by seventeen factors, including a close inspection of benches, fences, sidewalks and lawns (for a complete list, see Appendix E). The Open Space Index standard follows the City standards: 85% of parks should be rated "acceptable" for their Overall Condition and 90% should be rated "acceptable" for Cleanliness.

Collecting Data

To calculate park maintenance results for neighborhoods, the Open Space Index uses the Overall Condition and Cleanliness PIP ratings for all parks within neighborhood boundaries over the last three years. The PIP results are listed on each park's page on the DPR website. For each category, NY4P calculates a neighborhood's result by adding the number of park inspections that rated acceptable and dividing that number by the total number of inspections in neighborhood parks over the last three years. For an example, see Appendix F.

Litter in Frank Golden Memorial Park, College Point, Queens

A well-maintained planting in Bayview Terrace Park, Arden, Staten Island

Factors to Supplement the Open Space Index

Over the course of research and development, various elements of open space were considered for the Index. For the final version, NY4P determined that each element must be a) measurable, b) publicly accessible and c) reasonable for most New York City neighborhoods to achieve. The following elements of open space were strongly considered but ultimately left off of the final version of the Index. Other elements, such as natural areas and plazas, were incorporated into the elements that are included on the Index.

Green Roofs

Green roofs positively impact the urban environment by lowering air temperature, improving air quality and reducing storm water runoff. These vegetated rooftops ease pressure on city sewers by retaining 50-75% of rainwater that falls on them, and they have been shown to reduce the daily energy demand of the buildings they cover by up to 75%.[63] Because rooftops are among the hottest of heat retaining surfaces, green roofs can dramatically reduce the Urban Heat Island effect. The use of green roofs in urban environments is quickly expanding across the United States and internationally.[64] As many major cities grow, green roofs are being implemented to keep pace with rising energy costs and demands, poor air quality and lack of green open space.

Despite their many environmental benefits, green roofs were not included on the Open Space Index because so few of them are open to the public. As green roofs are constructed atop Department of Parks and other municipal buildings in New York, NY4P hopes that they will become publicly-accessible passive open space. Should this occur, a new indicator will be added to the Index to account for them.

THE DEPARTMENT OF PARKS AND RECREATION'S GREEN ROOF EFFORTS

In 2007, DPR began installing and testing various green roof systems atop its Five Borough Complex on Randall's Island. By the fall of 2009, 15 distinct systems were installed on over 12,000 square feet. By installing the systems side-by-side, DPR was able to determine which systems were most practical for further use across the City. DPR has identified 10 Recreation Centers that meet necessary specifications for green roof installation and has plans to proceed with installations in 2010. NY4P recommends that all DPR buildings include green roofs going forward.

The green roof atop the Department of Parks & Recreation's Five Borough Complex, Randall's Island

Albedo

The air temperature above natural grass, cement and artificial turf athletic fields varies significantly and can be evaluated by examining albedo, a measure of a surface's reflectivity. Artificial turf surfaces "are among the hottest possible for urban areas, rivaling dark roofs and fresh asphalt."[65] Grass fields and plants avoid reaching such high temperatures through natural evaporation of soil moisture through their leaves. The varying air temperatures above these surfaces can be measured in albedo. A surface with relatively low albedo such as asphalt or artificial turf results in generally higher air temperatures than natural grass. A study of synthetic turf in the Bronx by Columbia University's Center for Climate Systems Research found typical artificial turf surface temperatures of 140-160-degrees Fahrenheit on summer afternoons.[66] The heat radiating from these fields has health implications for users as well as environmental impacts contributing to the Urban Heat Island effect. Due to the complicated nature of accurately recording the measurement, this element is not included on the Index.

Maintenance: NY4P Report Card

NY4P's award-winning *Report Card on Parks* project is the only independent analysis of NYC park maintenance. It evaluates park conditions and assigns each park a grade A - F. It has sparked positive changes in the conditions of facilities within neighborhood parks by helping to justify increased funding and more efficient management of park services citywide. However, the Report Card project has not reached all 1,700 New York City parks. Because data are not available for all neighborhoods and parks, it was excluded from the Index. Communities that identify park maintenance as a priority should consult the NY4P website for available Report Card results in their neighborhood.

Park Programming

While the Parks Department has gathered some data in the past, it does not regularly collect data on the number of programs or program attendees in parks and recreation centers across the city. In the event that the Parks Department expands its collection of programming records, a programming element should be added to the Open Space Index. Examining the number of publicly-accessible programs occuring in neighborhood parks and recreation centers could be a very valuable measure. Possible approaches include calculating the number of programs administered or the number of hours of programming per year.


52
43
44

PART III: PILOT STUDY: LOWER EAST SIDE, MANHATTAN

Following the research and development period, NY4P tested the Open Space Index methodology in a pilot neighborhood, the Lower East Side of Manhattan. This neighborhood was chosen because of its variety of open spaces, rich demographic diversity and vibrant history of park and garden advocacy. The Pilot Study provided NY4P with an excellent opportunity to test the methodology and address lingering questions on specific open space elements. The Pilot Study consisted of an assessment of the open space elements as well as a Community Meeting where NY4P presented neighborhood results and received feedback from local residents.

The first step of the Pilot Study was to assess the neighborhood's existing open space conditions according to the Index. Using Geographic Information Systems (GIS), staff and interns mapped the Lower East Side to determine total park acreage, walking distance to parks, and number of community gardens, courts, fields, and playgrounds. The map at right illustrates the study area and some of the open space features within it.

The mapping analysis was followed by multiple visits to the neighborhood. On these visits, surveyors confirmed the location and contents of all open spaces, counted the number of playgrounds in each park and used a measuring wheel to measure the size of each play area, permeable surfaces within parks and irregularly-shaped fields and pools.

MAP LEGEND:

1 Dry Dock Playground
2 Hamilton Fish Park
3 Nathan Straus Playground
4 Wald Playground
5 Baruch Playground
6 East River Park
7 Luther Gulick Playground
8 Sandy Hillman Playground
9 Seward Park
10 Captain Jacob Joseph Playground
11 Little Flower Playground
12 Cherry Clinton Playground
13 Lillian D Wald Playground
14 Sol Lain Playground
15 Henry M Jackson Playground
16 Vladeck Park
17 Corlears Hook Park

Through the field visits, NY4P was able to round out the analysis and more closely describe and analyze existing conditions. This assessment of the neighborhood's conditions clearly illustrates how the Lower East Side compares to the Open Space Index's set of targets for open space provision and maintenance.

The matrix on page 36 outlines the Lower East Side's open space outcomes alongside the Index's standards. The *Lower East Side Totals* column catalogues the data collected for each element. The *Lower East Side Outcomes* column lists the conversion of the data into outcomes comparable to the Index standards listed in the far right column.

NY4P staff measuring the border of a garden in Seward Park, Chinatown, Manhattan

SEWARD PARK USER SURVEY

New Yorker for Parks staff (at center) surveying park users in Seward Park.

During the summer of 2008, New Yorkers for Parks and Baruch Survey Research conducted an extensive visitor survey in Seward Park, a well-used park in the southern part of the Lower East Side. This three-acre park possesses a number of active recreation features, a small community garden and passive, paved areas interspersed with tall trees. Based on NY4P counts over six weeks in the summer, Baruch Survey Research estimated that 58,000 people visited Seward Park. Surveyors approached every 10th person exiting the park and offered them a questionnaire. Some of the survey results:

49% of respondents were foreign-born, and
29% filled out the questionnaire in Chinese

99% of respondents live in same zip code as Seward Park

The majority of respondents visit the park to read or relax (rather than exercise, play sports, or visit the playground)

The lowest rated park features were bathrooms, drinking fountains and courts

The highest were lawns/gardens, tables/benches and play equipment

Open Space Index: Lower East Side*

(*Neighborhood scale determined by PlaNYC neighborhood boundary)
Neighborhood statistics: 535 acres; 72,258 residents; 18,181children

Open Space Elements	Lower East Side Totals	Lower East Side Outcomes	Proposed Neighborhood Standards
Active and Passive Open Space			
Active Open Space & Facilities	30.7 acres	0.42 acres/ 1000 residents	1 acre of open space/ 1,000 residents
Playgrounds	50 playgrounds	3.4 playgrounds/ 1,250 children	1 playground/ 1,250 children
Athletic Fields	15 fields	2.1 athletic fields/ 10,000 residents	1.5 fields/ 10,000 residents
Courts	67 courts	9.3 courts/ 10,000 residents	5 courts/ 10,000 residents
Recreation Centers	2 recreation centers	0.6 recreation centers/ 20,000 residents	1 recreation center/ 20,000 residents
Passive Open Space	55.6 acres	0.8 acre passive open space/ 1,000 residents	1.5 acres of open space/ 1,000 residents
Community Gardens	40 gardens	5.5 community gardens/ 10,000 residents	1 community garden/ 10,000 residents
Total Acres of Open Space	86.3 acres	1.2 acres of open space/ 1,000 residents	2.5 acres of open space/ 1,000 residents
Access and Distance to Parks			
Walking Distance to a Pocket Park (Less than 1 acre)	12 pocket parks	100% of residents are within a 5 minute walk	100% of residents are within a 5 minute walk
Walking Distance to a Neighborhood Park (1-20 acres)	7 neighborhood parks	100% of residents are within a 5 minute walk	100% of residents are within a 5 minute walk
Walking Distance to a Large Park (20+ acres)	1 large park	100% of residents are within a 10 minute walk	100% of residents are within a 10 minute walk
Environmental Sustainability			
Urban Tree Canopy Cover	14%	14%	44% (neighborhood target based on US Forest Service Survey)
Permeable Surface within Parks	54.9 acres	63%	70%
Park Maintenance			
Parks rated overall "acceptable" by DPR	80%	80%	85%
Parks rated "acceptable" on cleanliness by DPR	93%	93%	90%

Results: Areas of Excellence

The Pilot Study found that the Lower East Side performs very well with regard to community gardens, acres of active recreation, and walking distance to parks.

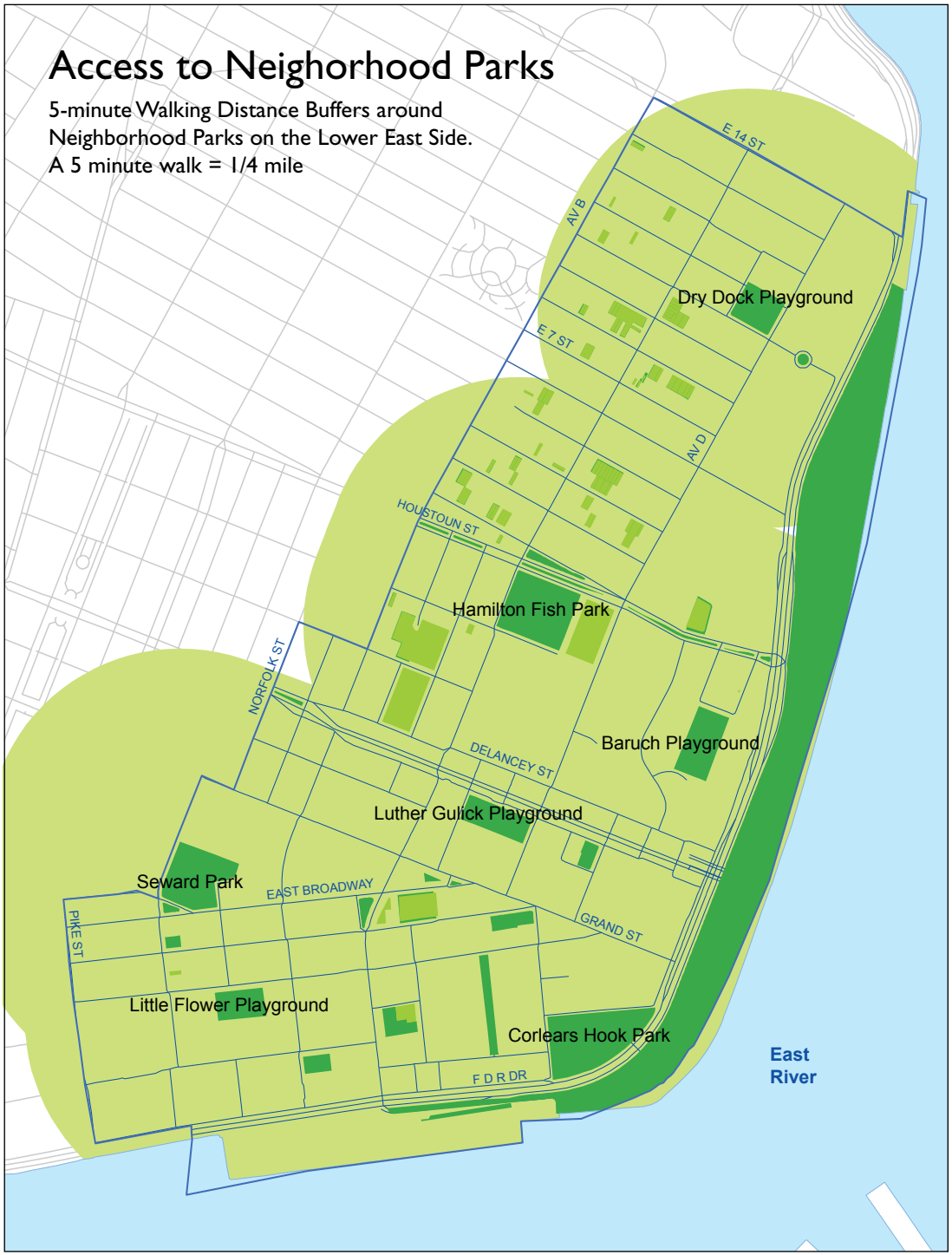
Community Gardens: With 40 community gardens, this neighborhood has one of the most vibrant community garden cultures in the City. Among them, some function as small farms, others provide serene places to visit and many are lively community gathering spots.

Active Recreation: The number of playgrounds, fields and courts on the Lower East Side exceed the Open Space Index targets for each category.

De Colores Community Garden

Secret Garden

Access: The Pilot Study revealed that the Lower East Side is very well-served in the Access elements of the Open Space Index. The map at right illustrates 1/4 mile buffers around the neighborhood's Neighborhood Parks. The buffers reveal that all residents are within a 5 minute walk of a Neighborhood Park. (The two small pockets on the far west side of the neighborhood are served by parks outside of the neighborhood boundary.) The map on page 39 illustrates the 1/2 mile buffer surrounding East River Park, a 57 acre park on the waterfront. This map shows that, with the exception of a small 4-block pocket on the far west side of the neighborhood, all residents live within a 1/2 mile walk of a Large Park. If the community decided that the area outside the buffer was problematic, it might consider advocating for improvements to the Neighborhood Parks close to that area or the conversion of a vacant lot into a garden.

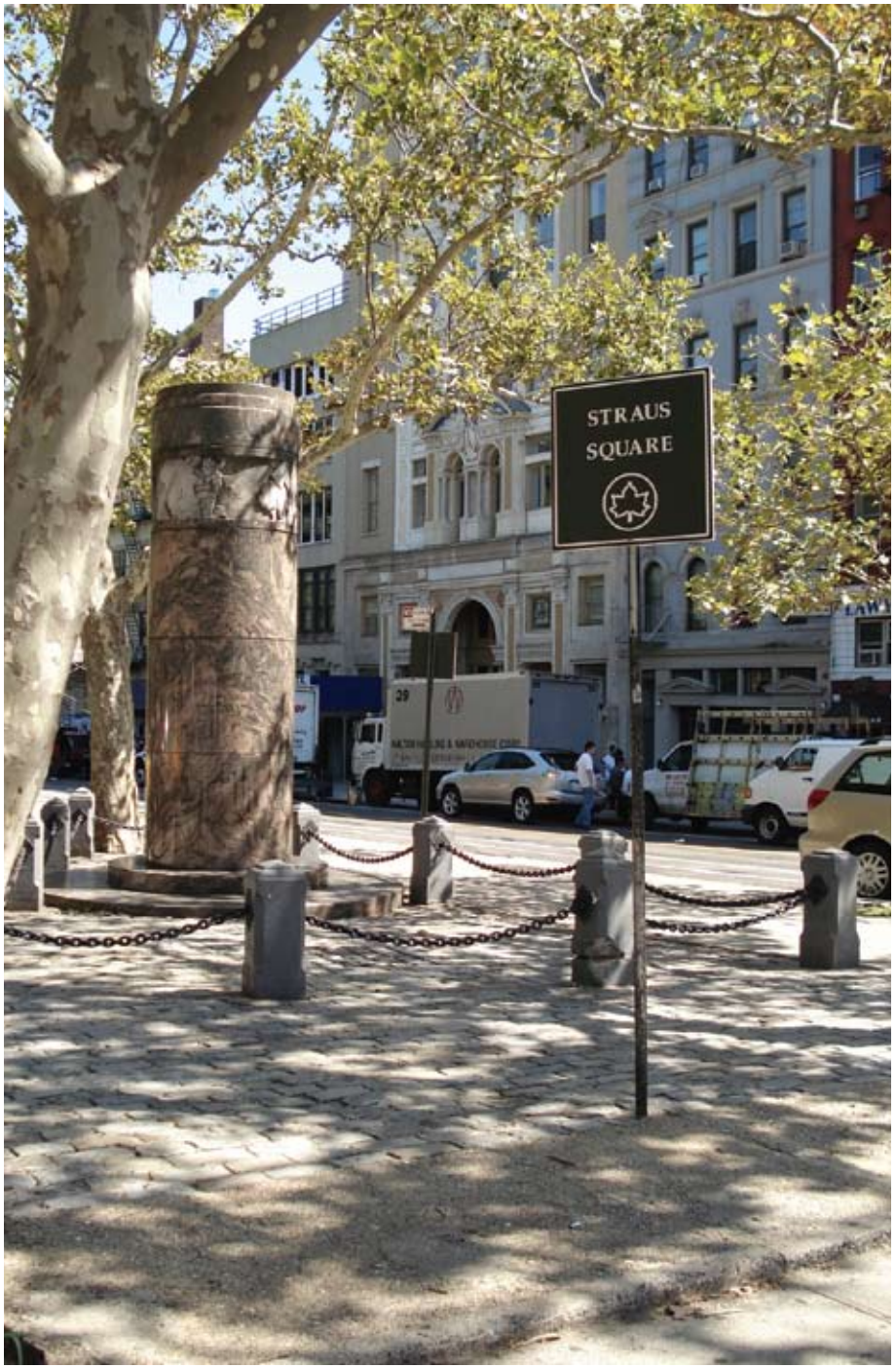



Access to Large Parks
10 minute walking buffer around East River Park,
the only Large Park on the Lower East Side.
10 minute walk = 1/2 mile
Lower East Side Parks and Gardens
1/2 mile walking distance around East River Park
E 14 ST
AV B
East River Park
NORFOLK ST
DELANCEY ST
GRAND ST
PIKE ST
F D R DR
East River

Results: Areas for Improvement

The Lower East Side has an urban tree canopy cover of only 14%, far below the US Forest Service's 44% recommendation for that neighborhood. The assessment also found that the Lower East Side parks have very little green, natural ground surfacing within parks. The deficient tree canopy coverage and permeable surfacing percentage indicate a poor environmental sustainability performance for the neighborhood. A lack of trees and grassy surfacing impacts park aesthetics and reduces the opportunities for park users to experience a connection to nature. A plan of action for this neighborhood might include advocating for empty tree pits to be filled and the conversion of some heavily-cemented park areas to grass surfacing.

Hard surfacing in Vladeck Park



Straus Square, a largely impermeable Greenstreet on the Lower East Side

Community Meeting

After months of data collection, New Yorkers for Parks held a public workshop on the Lower East Side to present the Open Space Index and our assessment of the neighborhood to the community. The purpose of this meeting was to help the community identify its open space needs, establish its priorities and determine an advocacy strategy for improvements to their neighborhood open spaces.

To publicize the meeting, NY4P invited over 40 community stakeholders, including local health, education, immigrant, youth, housing and commercial advocates. Additionally, flyers were distributed throughout the neighborhood, and elected officials' offices were informed of the meeting. Neighborhood residents, community advocates and Parks Department officials attended the meeting. NY4P provided Spanish and Chinese translators at the meeting.

Community Feedback

After a brief overview of the Open Space Index project by NY4P staff, attendees were invited to use stickers to indicate the elements of open space most important to them, see picture below.

The interactive exercise revealed that the top priorities for the attendees were "more trees" and "more grassy passive areas." Interestingly, the Pilot Study assessment also identified those two categories as particularly lacking in the neighborhood. During the meeting, participants had a robust discussion of parks in the neighborhood as well as the Index and its usefulness.

Residents voting on their open space priorities

Finally, NY4P presented the results of the Open Space Index and Community Meeting to the Parks Committee of Community Board 3. It is NY4P's hope that the Community Board will use the Open Space Index assessment and community feedback to focus its attention on the following neighborhood issues shown to need improvement: the tree deficit and the lack of natural surfacing in parks. The Index and its accompanying data and literature should provide the Community Board with documentation to support their advocacy efforts.

BRINGING THE OPEN SPACE INDEX TO YOUR NEIGHBORHOOD

Through its Neighborhood Parks Services program, New Yorkers for Parks will work with communities to complete Open Space Index assessments and develop a strategic advocacy agenda. Communities wishing to improve open space and environmental sustainability locally can use the Open Space Index to evaluate current conditions and initiate the advocacy process.

New Yorkers for Parks' Role

NY4P will conduct a thorough survey of the neighborhood: identifying open spaces, taking measurements and completing all GIS mapping necessary to the assessment. In instances where community volunteers are available to help in these efforts, NY4P will provide technical assistance to support them. When the surveying is complete, NY4P will conduct a public workshop to report the assessment results to community stakeholders. The community stakeholders can use these results to shape their advocacy priorities.

Neighborhood Parks Services

Step 1: Community Organizing

For communities to leverage the results of an Open Space Index assessment and successfully advocate for improvements, the engagement and involvement of a variety of stakeholders is essential. Outreach should include a diverse group of residents representative of the neighborhood demographics. Representatives from local non-profits, schools, housing developments, businesses, cultural institutions and the offices of local Community Board and Council Members should be included.

All outreach conducted by community stakeholders and/or NY4P should be inclusive. In neighborhoods with substantial immigrant populations, language access is critical. Translations of public meeting advertisements should be provided, and translators should be present at all meetings. Meetings should be held in accessible locations convenient to public transportation.

Step 2: Establishing Goals

Prior to the assessment, NY4P staff will meet with neighborhood representatives to create a work plan, establish a time line and identify local resources that can contribute to a successful assessment.

Step 3: Collecting Data for the Open Space Index

NY4P will guide the data collection but will rely on local stakeholders for knowledge of unconventional open space, recreational and environmental resources. Residents know their community better than anyone else, and local knowledge will greatly enrich the assessment.

Step 4: Presentation of Assessment at Public Workshop

NY4P will present the results of the open space assessment at a community meeting in the neighborhood. The primary purpose of this meeting is to share data with community members that will guide the direction of their future advocacy. The meeting will be one part presentation, one part discussion and one part brainstorming exercise.

Step 5: The Community Develops an Advocacy Agenda

As the community identifies their open space priorities, NY4P will continue to provide technical assistance, advocate on behalf of these priorities and advise on strategy as requested by the community.

APPENDICES

A: PlaNYC Neighborhood Boundary Maps (by borough)

B: Advisory Interviewees

C: Field and Court Dimensions

D: Neighborhood Tree Canopy Goals

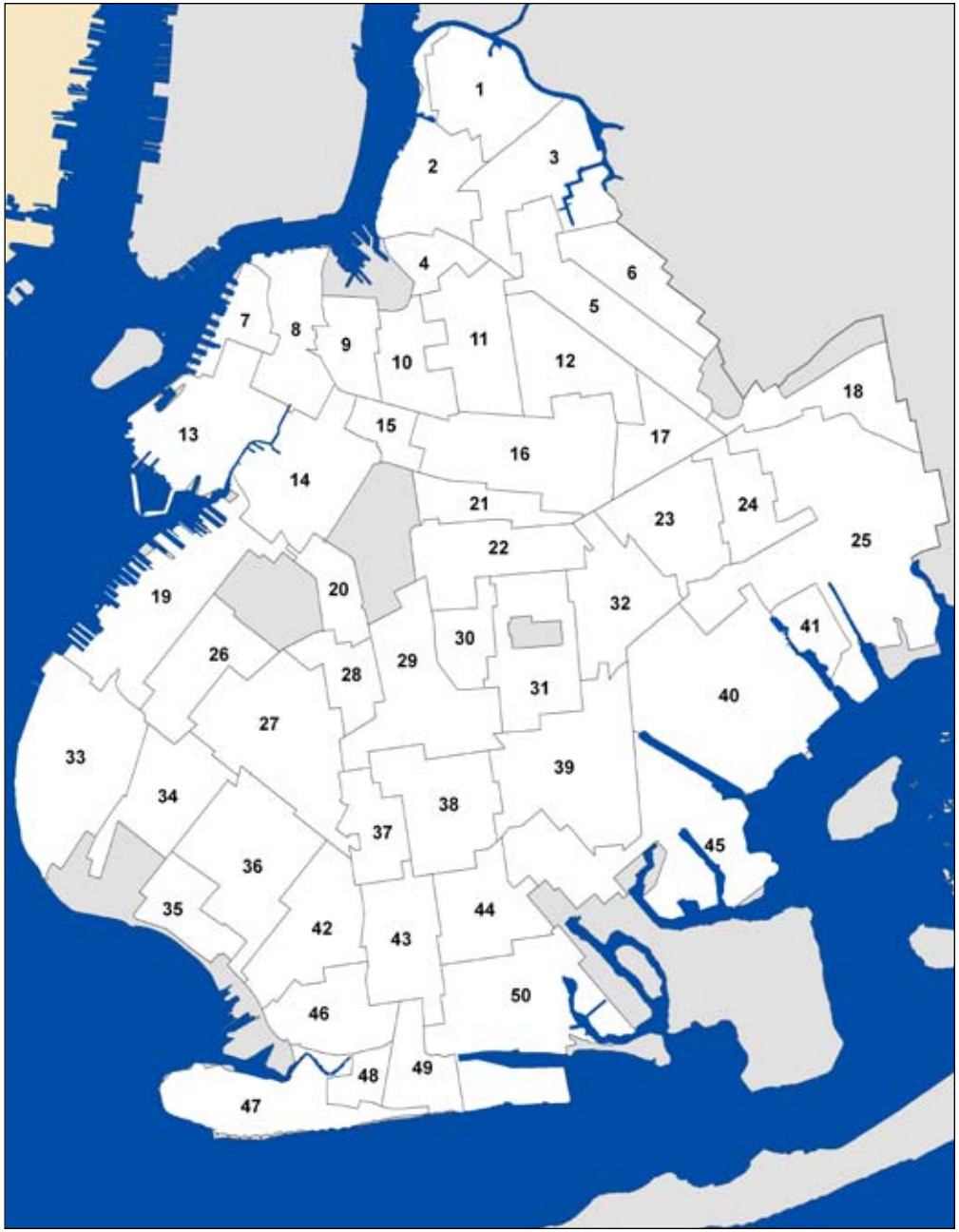
E: Maintenance

F: Maintenance Calculations for Pilot Study on Lower East Side

Appendix A: PlaNYC Neighborhood Boundary Maps (by borough)

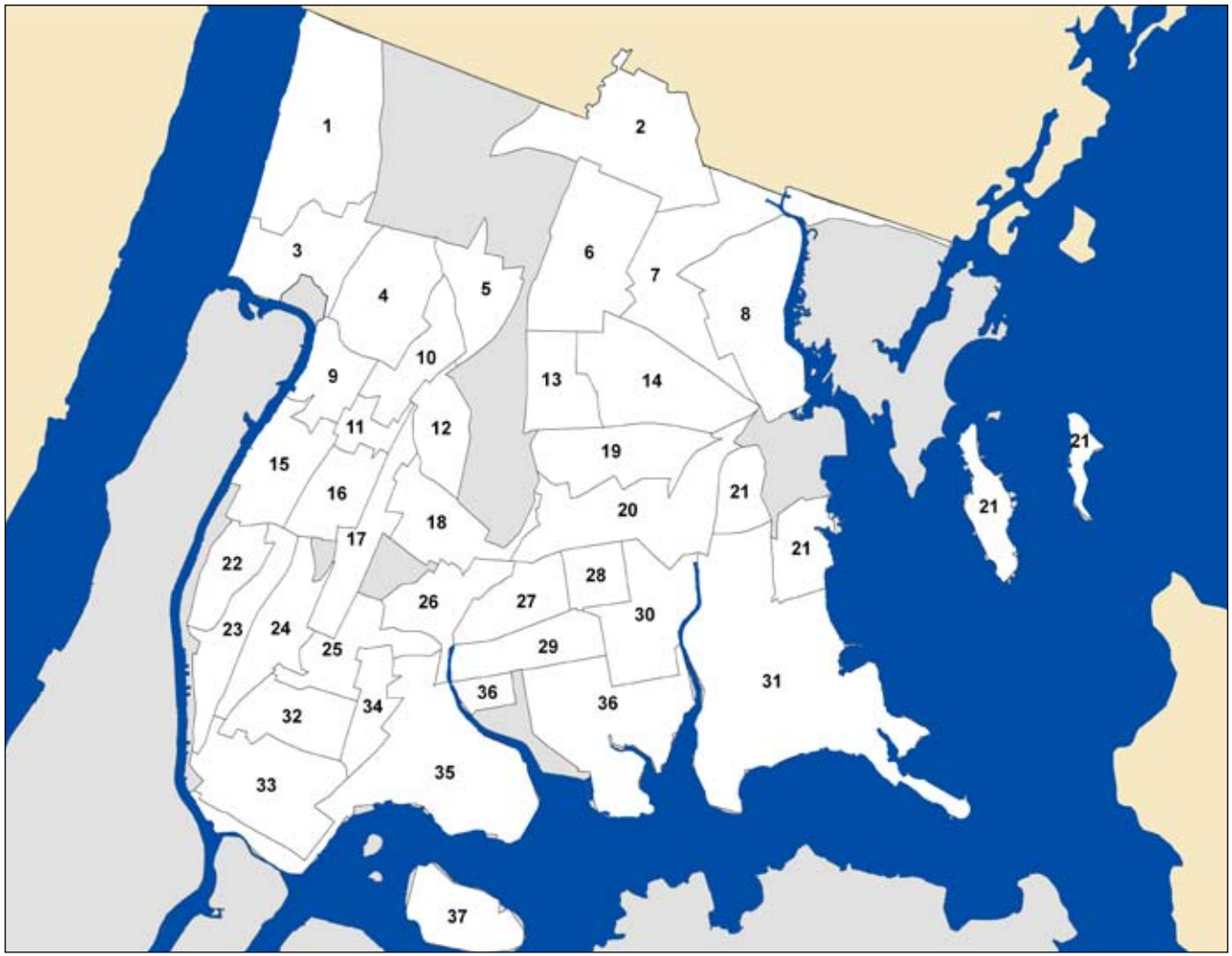
Brooklyn

1	Greenpoint	26	Sunset Park East
2	North Side - South Side	27	Borough Park
3	East Williamsburg	28	Kensington - Ocean Parkway
4	Williamsburg	29	Flatbush
5	Bushwick South	30	Erasmus
6	Bushwick North	31	East Flatbush - Farragut
7	Brooklyn Heights - Cobble Hill	32	Rugby - Remsen Village
8	DUMBO - Vinegar Hill - Downtown Brooklyn - Boerum Hill	33	Bay Ridge
9	Fort Greene	34	Dyker Heights
10	Clinton Hill	35	Bath Beach
11	Bedford	36	Bensonhurst West
12	Stuyvesant Heights	37	Ocean Parkway South
13	Carroll Gardens - Columbia - Red Hook	38	Midwood
14	Park Slope - Gowanus	39	Flatlands
15	Prospect Heights	40	Canarsie
16	Crown Heights North	41	Starrett City
17	Ocean Hill	42	Bensonhurst East
18	Cypress Hills - City Line	43	Homecrest
19	Sunset Park West	44	Madison
20	Windsor Terrace	45	Georgetown - Marine Park - Bergen Beach - Mill Basin
21	Crown Heights South	46	Gravesend
22	Prospect Heights - Lefferts Gardens - Wingate	47	Seagate - Coney Island
23	Brownsville	48	West Brighton
24	East New York (part B)	49	Brighton Beach
25	East New York (part A)	50	Sheepshead Bay - Gerritsen Beach - Manhattan Beach



Bronx

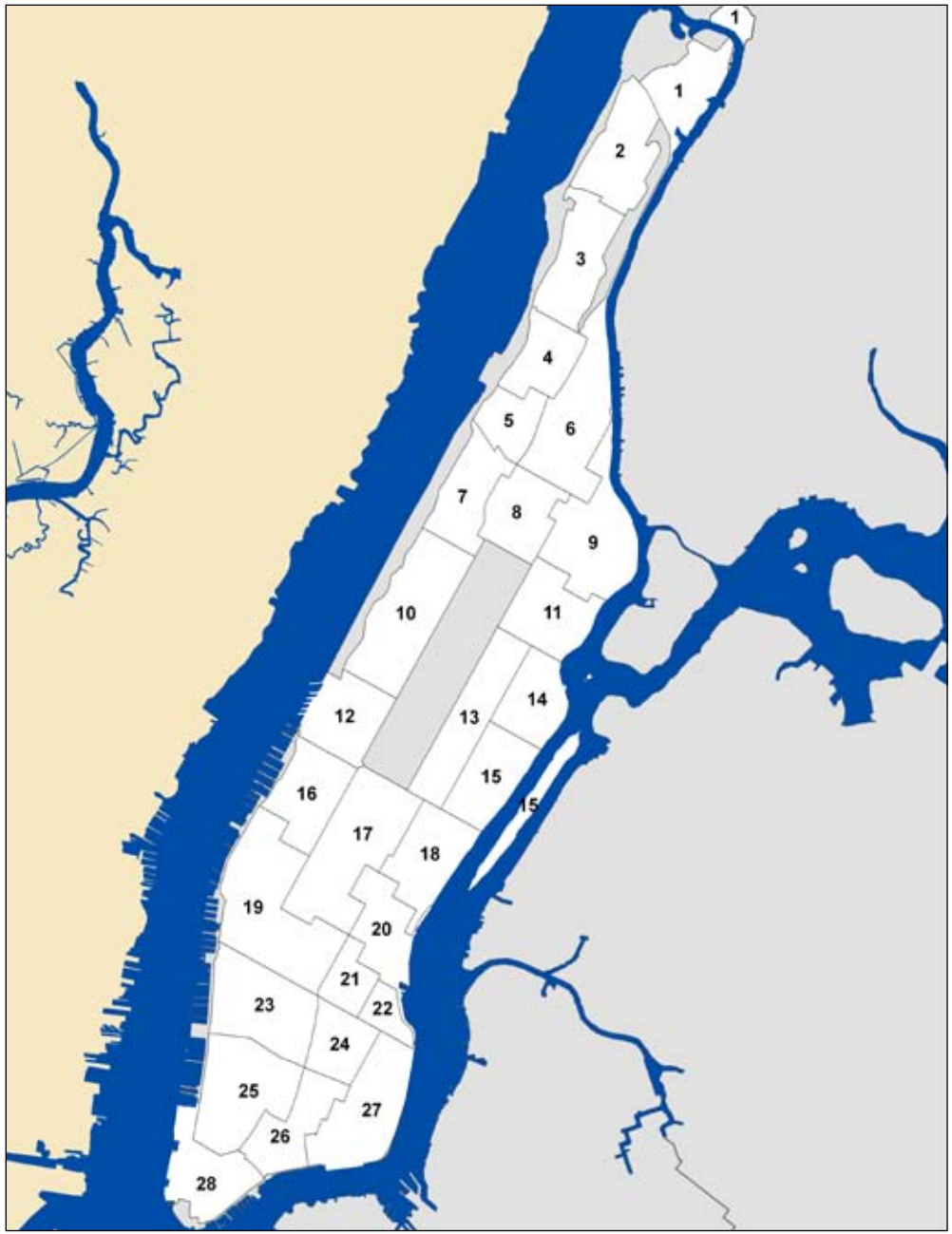
1	North Riverdale - Fieldston - Riverdale
2	Woodlawn - Wakefield
3	Spuyten Duyvil - Kingsbridge
4	Van Cortlandt Village
5	Norwood
6	Williamsbridge - Olinville
7	Eastchester - Edenwald - Baychester
8	Co-Op City
9	Kingsbridge Heights
10	Bedford Park - Fordham North
11	Fordham South
12	Belmont
13	Bronxdale
14	Allerton - Pelham Gardens
15	University Heights - Morris Heights
16	Mount Hope
17	Claremont - Bathgate
18	East Tremont
19	Pelham Parkway
20	Van Nest - Morris Park - Westchester Square
21	Pelham Bay - Country Club - City Island
22	Highbridge
23	West Concourse
24	East Concourse - Concourse Village
25	Morrisania - Melrose
26	Crotona Park East
27	West Farms - Bronx River
28	Parkchester
29	Soundview - Bruckner
30	Westchester - Unionport
31	Schuylerville - Throgs Neck - Edgwater Park
32	Melrose South - Mott Haven North
33	Mott Haven - Port Morris



34	Longwood
35	Hunts Point
36	Soundview - CastleHill - Clason Point - Harding Park
37	Riker's Island

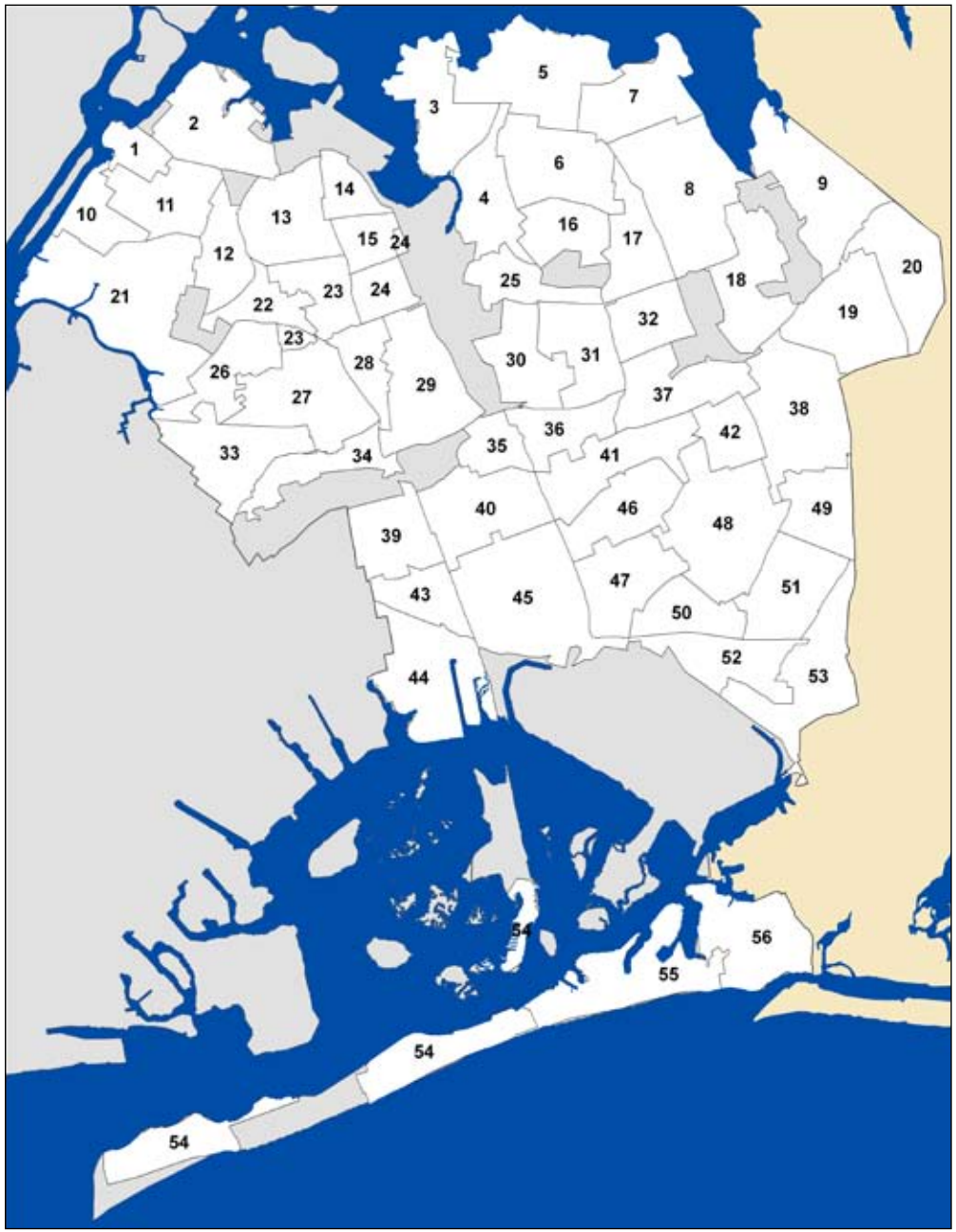
Manhattan

1	Marble Hill - Inwood	15	Lenox Hill - Roosevelt Island
2	Washington Heights North	16	Clinton
3	Washington Heights South	17	Midtown - Midtown South
4	Hamilton Heights	18	Turtle Bay - East Midtown
5	Manhattanville	19	Hudson Yards - Chelsea - Flatiron - Union Square
6	Central Harlem North - Polo Grounds	20	Murray Hill - Kips Bay
7	Morningside Heights	21	Gramercy
8	Central Harlem South	22	Stuyvesant Town - Peter Cooper Village
9	East Harlem North	23	West Village
10	Upper West Side	24	East Village
11	East Harlem South	25	SoHo - Tribeca - Civc Center - Little Italy
12	Lincoln Square	26	Chinatown
13	Upper East Side - Carnegie Hill	27	Lower East Side
14	Yorkville	28	Battery Park City - Lower Manhattan



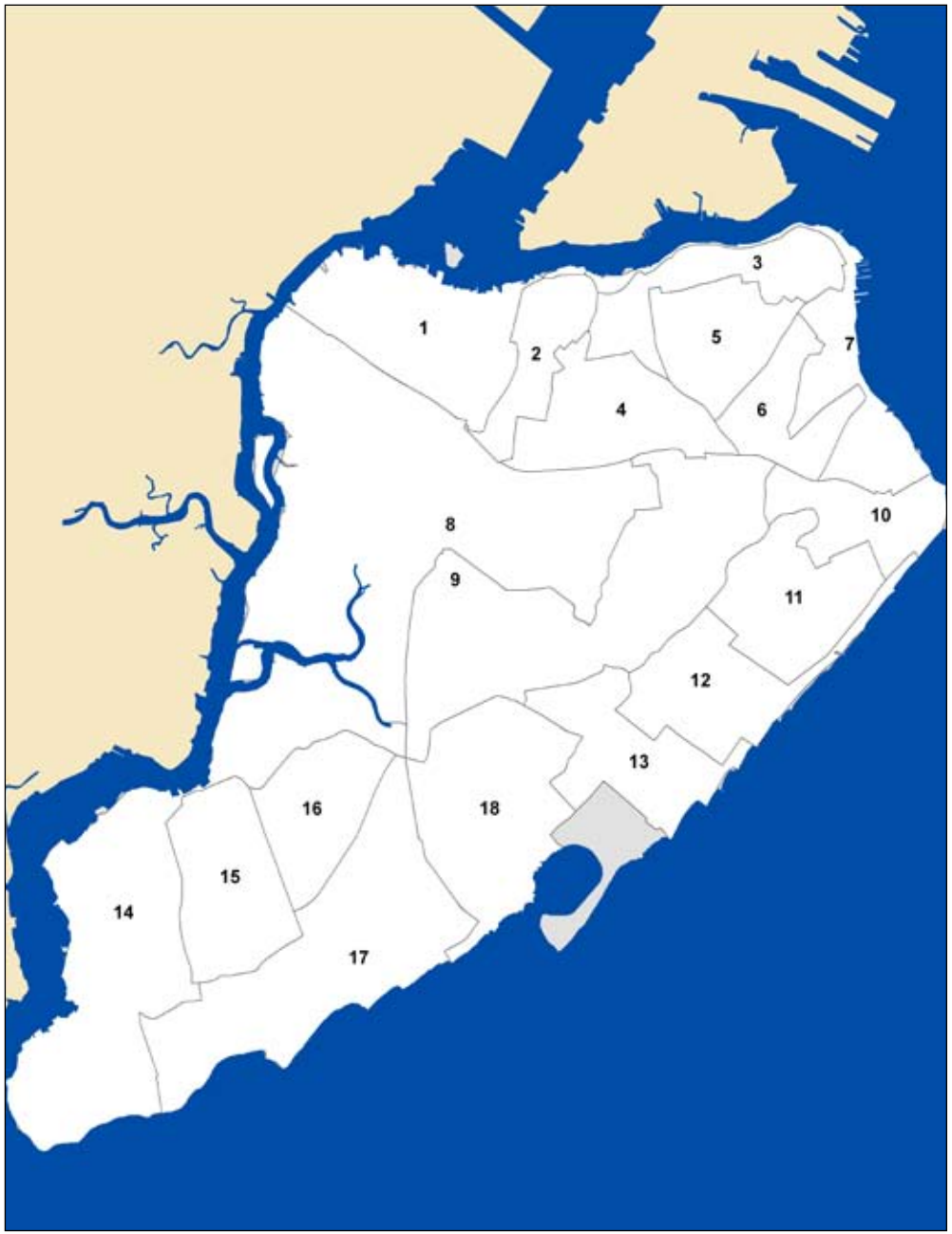
Queens

1	Old Astoria	29	Forest Hills
2	Steinway	30	Kew Gardens Hills
3	College Point	31	Pomonok - Flushing Heights - Hillcrest
4	Flushing	32	Fresh Meadows - Utopia
5	Whitestone	33	Ridgewood
6	Murray Hill	34	Glendale
7	Fort Totten - Bay Terrace - Clearview	35	Kew Gardens
8	Bayside - Bayside Hills	36	Briarwood - Jamaica Hill
9	Douglas Manor - Douglaston - Little Neck	37	Jamaica Estates-Holliswood
10	Qeensbridge - Ravenswood - Long Island City N	38	Queens Village
11	Astoria	39	Woodhaven
12	Woodside	40	Richmond Hill
13	Jackson Heights	41	Jamaica
14	East Elmhurst	42	Hollis
15	North Corona	43	Ozone Park
16	East Flushing	44	Lindenwood - Howard Beach
17	Auburndale	45	South Ozone Park
18	Oakland Gardens	46	South Jamaica
19	Bellerose	47	Baisley Park
20	Glen Oaks - Floral Park - New Hyde Park	48	St. Albans
21	Hunters Point - Sunnyside - West Maspeth	49	Cambria Heights
22	Elmhurst - Maspeth	50	Springfield Gardens North
23	Elmhurst	51	Laurelton
24	Corona	52	Springfield Gardens South - Brookville
25	Queensboro Hill	53	Rosedale
26	Maspeth	54	Breezy Point - Belle Harbor - Rockway Park - Broad Channel
27	Middle Village	55	Hammels - Arverne - Edgemere
28	Rego Park	56	Far Rockaway - Bayswater



Staten Island

1	Mariners Harbor - Arlington - Port Ivory - Graniteville
2	Port Richmond
3	West New Brighton - New Brighton - St. George
4	Westerleigh
5	New Brighton - Silver Lake
6	Grymes Hill - Clifton - Fox Hills
7	Stapleton - Rosebank
8	New Springville - Bloomfield - Travis
9	Todt Hill - Emerson Hill -Heartland Village - Lighthouse Hill
10	Grasmere - Arrochar - Fort Wadsworth
11	Old Town - Dongan Hills - South Beach
12	New Dorp - Midland Beach
13	Oakwood - Oakwood Beach
14	Charleston - Richmond Valley - Tottenville
15	Rossville - Woodrow
16	Arden Heights
17	Annadale - Huguenot - Prince's Bay - Eltingville
18	Great Kills



Appendix B: Advisory Interviewees

Tom Angotti, Hunter College, Department of Urban Affairs & Planning, Center for Community Planning & Development

Anthony Borelli & staff, Manhattan Borough President's office

Paige Cowett, Hunter College, Department of Urban Affairs & Planning, Center for Community Planning & Development

Peter Harnik, Trust for Public Land

Minona Heaviland, NYC Department of Parks & Recreation

Jennifer Henry, U.S. Green Building Council

Gavin Kearney, NY Lawyers for the Public Interest

Joshua Laird, NYC Department of Parks & Recreation

Nora Libertun de Duren, NYC Department of Parks & Recreation

Jack Linn, NYC Department of Parks & Recreation

Evan Mason, Landmark West!

Morgan Monaco, NYC Department of Parks & Recreation

Munsun Park, Jonathan Rose Companies

Robert Pirani, Regional Plan Association

Heather Smith, Congress for the New Urbanism

Andy Stone, Trust for Public Land

James Subudhi, We Act

Anna Vincenty, Nos Quedamos

Bill Woods, NYC Department of City Planning

Appendix C: Field and Court Dimensions

Field and Court Dimensions	
Type	**Square footage**
Baseball Field (Standard)	70,650[67]
Baseball Field (Little League)	25,447[68]
Basketball Court	4,200[69]
Bocce Court	850[70]
Cricket Pitch & Field	No fixed size, measure cricket fields with a measuring wheel.
Football Field	57,600[71]
Golf Course	No fixed size, contact course manager or use DPR website.
Handball Court	680[72]
Hockey Rink	17,000[73]
Running Track	No fixed size, measure tracks with a measuring wheel.
Pool	
a) Long-Course	12,300[74]
b) Short-Course	3,375[75]
c) Diving Pool	4,500[76]
Soccer Field (standard)	54,000[77]
Soccer field (small)	27,000[78]
Tennis Court	5,940[79]
Volleyball Court	1,800[80]
**When in doubt, measure features with measuring wheel.	

Appendix D: Urban Tree Canopy (UTC) Goals by Neighborhood

From *A Report on New York City's Present and Possible Urban Tree Canopy*. Prepared by USDA Forest Service at the request of NYC DPR. J. Morgan Grove, Jarlath O'Neil-Dunne, Keith Pelletier, David Nowak, Jeff Walkton. Table 6: Existing, Possible, and Relative UTC by Neighborhood, July 2006.

Neighborhood	Existing UTC	Possible UTC
Allerton - Pelham Gardens	20%	42%
Annadale - Huguenot - Prince's Bay - Eltingville	41%	40%
Arden Heights	35%	38%
Astoria	12%	36%
Auburndale	26%	40%
Baisley Park	32%	38%
Bath Beach	13%	40%
Bathgate - Claremont	12%	44%
Battery Park City - Lower Manhattan	4%	36%
Bay Ridge	25%	31%
Bayside - Bayside Hills	29%	39%
Bedford	14%	40%
Bedford Park - Fordham North	12%	33%
Bellerose	28%	42%
Belmont	15%	40%
Bensonhurst East	11%	40%
Bensonhurst West	12%	39%
Borough Park	19%	33%
Breezy Point - Belle Harbor - Rockaway Park - Broad Channel	9%	62%
Briarwood - Jamaica Hill	23%	39%
Brighton Beach	15%	38%
Bronxdale	19%	37%
Brooklyn Heights - Cobble Hill	12%	40%
Brownsville	16%	42%
Bushwick	13%	40%
Bushwick North	11%	34%
Cambria Heights	21%	45%

Neighborhood	Existing UTC	Possible UTC
Canarsie	28%	37%
Carnegie Hill - Upper East Side	5%	25%
Carroll Gardens - Red Hook	15%	43%
Central Harlem North - Polo Grounds	13%	38%
Central Harlem South	7%	36%
Charleston - Richmond Valley - Tottenville	37%	51%
Chinatown	8%	31%
Clearview - Bay Terrace - Fort Totten	22%	49%
Clinton	5%	28%
Clinton Hill	19%	35%
College Point	16%	54%
Co-Op City	18%	50%
Corona	12%	41%
Crotona Park East	12%	47%
Crown Heights North	21%	34%
Crown Heights South	18%	30%
Cypress Hills - City Line	15%	39%
Douglas Manor - Douglaston - Little Neck	34%	42%
DUMBO - Vinegar Hill - Downtown Brooklyn - Boerum Hill	11%	35%
Dyker Heights	18%	37%
East Concourse - Concourse Village	9%	41%
East Elmhurst	21%	39%
East Flatbush - Farragut	22%	34%
East Flushing	29%	41%
East Harlem North	13%	42%
East Harlem South	13%	39%
East New York (part A)	20%	47%
East New York (part B)	11%	43%
East Tremont	10%	45%
East Village	13%	26%
East Williamsburg	6%	47%
Eastchester - Edenwald - Baychester	26%	40%

Neighborhood	Existing UTC	Possible UTC
Elmhurst	14%	35%
Elmhurst - Maspeth	18%	37%
Erasmus	16%	33%
Far Rockaway - Bayswater	28%	41%
Flatbush	29%	28%
Flatiron - Union Square - Chelsea	6%	27%
Flatlands	21%	36%
Flushing	15%	37%
Fordham South	5%	35%
Forest Hills	27%	34%
Fort Greene	20%	39%
Fresh Meadows - Utopia	32%	37%
Glen Oaks - Floral Park - New Hyde Park	28%	43%
Glendale	14%	39%
Gramercy	8%	23%
Grasmere - Arrochar	25%	44%
Gravesend	19%	45%
Great Kills	26%	47%
Greenpoint	6%	41%
Grymes Hill - Clifton - Fox Hills	43%	36%
Hamilton Heights	10%	35%
Hammels - Arverne - Edgemere	16%	61%
Highbridge	18%	37%
Hollis	23%	42%
Homecrest	19%	35%
Hunters Point - Sunnyside - West Maspeth	8%	47%
Hunts Point	8%	51%
Jackson Heights	17%	38%
Jamaica	10%	45%
Jamaica Estates - Holliswood	39%	34%
Kensington - Ocean Parkway	20%	33%
Kew Gardens	29%	39%
Kew Gardens Hills	29%	36%

Neighborhood	Existing UTC	Possible UTC
Kingsbridge Heights	12%	47%
Laurelton	31%	41%
Lenox Hill - Roosevelt Island	8%	36%
Lincoln Square	6%	36%
Lindenwood - Howard Beach	24%	47%
Longwood	8%	43%
Lower East Side	14%	44%
Madison	21%	35%
Manhattanville	12%	39%
Marble Hill - Inwood	9%	42%
Marine Park - Georgetown - Bergen Beach	26%	44%
Mariner's Harbor - Arling - Graniteville	25%	53%
Maspeth	12%	40%
Melrose South - Mott Haven North	13%	43%
Middle Village	24%	45%
Midtown - Midtown South	1%	20%
Midwood	28%	30%
Morningside Heights	12%	35%
Morris Heights	16%	42%
Morrisania - Melrose	17%	40%
Mott Haven - Port Morris	12%	38%
Mount Hope	8%	36%
Murray Hill	31%	35%
Murray Hill - Kips Bay	6%	29%
New Brighton - Silver Lake	36%	40%
New Dorp - Midland Beach	17%	53%
New Springville - Bloomfield - Chelsea - Travis	32%	53%
North Corona	15%	39%
North Side - South Side	5%	41%
Norwood	21%	32%
Oakland Gardens	31%	38%
Oakwood - Oakwood Beach	25%	46%
Ocean Hill	14%	42%

Neighborhood	Existing UTC	Possible UTC
Ocean Parkway South	25%	36%
Old Astoria	12%	41%
Old Town - Dongan Hills	20%	55%
Ozone Park	16%	46%
Park Slope - Gowanus	19%	30%
Parkchester	28%	30%
Pelham Bay - Country Club - City Island	13%	53%
Pelham Parkway	23%	39%
Pomonok - Flushing Heights - Hillcrest	26%	40%
Port Richmond	25%	41%
Prospect Heights	19%	32%
Prospect Lefferts Gardens - Wingate	22%	32%
Queens Village	22%	42%
Queensboro Hill	26%	43%
Queensboro Hill - Ravenswood - Long Island City	11%	40%
Rego Park	22%	35%
Richmond Hill	15%	42%
Ridgewood	14%	41%
Riker's Island	8%	92%
Riverdale - Fieldston	51%	30%
Rosedale	42%	38%
Rossville - Woodrow	35%	41%
Rugby - Remsen Village	16%	35%
Schuylerville - Throgs Neck - Edgewater Park	15%	56%
Seagate - Coney Island	13%	54%
Sheepshead Bay - Manhattan Beach - Gerritsen Beach	19%	41%
SoHo - Tribeca - Little Italy	3%	24%
Soundview - Castle Hill - Clason Point	19%	48%
Soundview-Bruckner	17%	40%
South Jamaica	22%	43%
South Ozone Park	22%	43%
Springfield Gardens - South Brookvile	30%	35%
Springfield Gardens North	33%	39%

Neighborhood	Existing UTC	Possible UTC
Spuyten Duyvil - Kingsbridge	28%	38%
St. Albans	26%	42%
Stapleton - Rosebank	20%	49%
Starrett City	41%	36%
Steinway	13%	46%
Stuyvesant Heights	18%	37%
Stuyvesant Town - Peter Cooper Village	18%	46%
Sunset Park East	17%	35%
Sunset Park West	11%	39%
Todt Hill - Emerson Hill - Heartland Village	51%	33%
Turtle Bay - East Midtown	4%	27%
Upper West Side	6%	32%
Van Cortlandt Village	16%	48%
Van Nest - Morris Park - Westchester Square	16%	45%
Washington Heights North	19%	32%
Washington Heights South	7%	33%
West Brighton	23%	46%
West Concourse	12%	37%
West Farms - Bronx River	14%	38%
West New Brighton - New Brighton - St. George	35%	37%
West Village	9%	23%
Westchester - Union Port	11%	43%
Westerleigh	38%	35%
Whitestone	25%	44%
Williamsbridge - Olinville	18%	39%
Williamsburg	11%	32%
Windsor Terrace	23%	32%
Woodhaven	16%	39%
Woodlawn - Wakefield	20%	41%
Woodside	14%	37%
Yorkville	12%	29%

Appendix E: Maintenance

Features inspected by DPR's Parks Inspection Program (PIP) and included in the Overall Condition rating:

Glass
Graffiti
Litter
Ice
Weeds
Benches
Fences
Paved Surfaces
Play Equipment
Safety Surface
Sidewalks
Athletic Fields
Horticultural area
Lawns
Trails
Trees
Water Bodies

Appendix F: Maintenance Calculations for Pilot Study on Lower East Side

PIP Results from January 1, 2006 to December 31, 2008					
Park	Inspection details	Cleanliness Acceptable	Cleanliness Unacceptable	Overall Condition Acceptable	Overall Condition Unacceptable
Ahearn Park	inspected 4 times; cleanliness acceptable 4 times, overall acceptable 4 times	4	0	4	0
Baruch Houses Plgd	inspected 6 times; cleanliness acceptable 4 times, overall acceptable 3 times	4	2	3	3
Captain Jacob Joseph Playground	inspected 5 times; cleanliness acceptable 3 times, overall acceptable 3 times	3	2	3	2
Cherry Clinton Playground	inspected 6 times; cleanliness acceptable 5 times, overall acceptable 4 times	5	1	4	2
Corlears Hook Park	inspected 5 times; cleanliness acceptable 5 times, overall acceptable 4 times	5	0	4	1
Dry Dock Playground	inspected 6 times; cleanliness acceptable 6 times, overall acceptable 5 times	6	0	5	1
East River Park (section 1)	inspected 5 times; cleanliness acceptable 5 times, overall acceptable 3 times	5	0	3	2
East River Park- zone 1	inspected 6 times; cleanliness acceptable 6 times, overall acceptable 5 times	6	0	5	1
East River Park- zone 2	inspected 5 times; cleanliness acceptable 5 times, overall acceptable 4 times	5	0	4	1
East River Park- zone 3	inspected 6 times; cleanliness acceptable 6 times, overall acceptable 5 times	6	0	5	1
East River Park- zone 4	inspected 6 times; cleanliness acceptable 6 times, overall acceptable 6 times	6	0	6	0
East River Park- zone 5	inspected 5 times; cleanliness acceptable 5 times, overall acceptable 4 times	5	0	4	1
East River Park- zone 6	inspected 8 times; cleanliness acceptable 7 times, overall acceptable 6 times	7	1	6	2
Gustave Hartman Square	last inspected in 2001	0	0	0	0
Hamilton Fish Park	inspected 5 times; cleanliness acceptable 5 times, overall acceptable 4 times	5	0	4	1

PIP Results from January 1, 2006 to December 31, 2008					
Henry M Jackson Playground	inspected 5 times; cleanliness acceptable 5 times, overall acceptable 5 times	5	0	5	0
Lillian D Wald Playground	inspected 8 times; cleanliness acceptable 7 times, overall acceptable 6 times	7	1	6	2
Little Flower Playground	inspected 6 times; cleanliness acceptable 6 times, overall acceptable 4 times	6	0	4	2
Luther Gulick Playground	inspected 7 times; cleanliness acceptable 6 times, overall acceptable 5 times	6	1	5	2
Nathan Straus Playground	inspected 4 times; cleanliness acceptable 4 times, overall acceptable 3 times	4	0	3	1
Sidney Hillman Plgd	inspected 8 times; cleanliness acceptable 7 times, overall acceptable 7 times	7	1	7	1
Seward Park	inspected 5 times; cleanliness acceptable 5 times, overall acceptable 5 times	5	0	5	0
Sol Lain Playground	inspected 6 times; cleanliness acceptable 6 times, overall acceptable 5 times	6	0	5	1
Straus Square Greenstreet	inspected 2 times; cleanliness acceptable 2 times, overall acceptable 2 times	2	0	2	0
Vladeck Park	no data	0	0	0	0
Wald Playground/ Lillian Wald Houses	inspected 6 times; cleanliness acceptable 6 times, overall acceptable 6 times	6	0	6	0
	TOTALS	**126**	**9**	**108**	**27**
135 inspections					
93% were acceptable for cleanliness					
80% were acceptable for overall condition					

ENDNOTES

[1] New York City Population Projections by Age/Sex & Borough 2000-2030. New York City Department of City Planning (DCP), Population Division, December 2006. http://www.nyc.gov/html/dcp/pdf/census/projections_report.pdf.

[2] DCP's Population Division provided a breakdown of the projected population increase for each of the city's 188 neighborhoods. The City's data do not include defined population projections for each neighborhood, instead it includes ranges of projected population increases. (For example, the population of Lower East Side Manhattan will likely increase from between 5,000 to 7,499 people by the year 2030). In order to project open space ratios for the future, an actual number (not a range) was needed. With guidance from the DCP's Population Division Director, Joe Salvo, New Yorkers for Parks calculated a mathematically sound population projection for each neighborhood and was able to estimate the open space ratios (# acres/1,000 people) that can be expected in the year 2030.

[3] "Valuing Central Park's Contributions to New York City's Economy." Appleseed, May 2009.

[4] "The Impact of Hudson River Park on Property Values Study." Commissioned by Friends of Hudson River Park, researched by the Regional Plan Association with support from the Real Estate Board of New York, October 2008. http://www.rpa.org/2008/10/the-impact-of-hudson-river-par.html.

[5] "How Smart Parks Investment Pays its Way: Analysis of Secondary Economic Impacts of Park Expenditures on New York City Parks." A joint study by New Yorkers for Parks and Ernst & Young, LLP, 2002.

[6] Ioan Voicu and Vicki Been. "The Effect of Community Gardens on Neighboring Property Values." Furman Center for Real Estate and Urban Policy, New York University and New York University School of Law, August 2006, p 32.

[7] "Increasing Physical Activity." A Report on Recommendations of the Task Force on Community Preventive Services, Centers for Disease Control & Prevention, October 1, 2001. http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5018a1.htm.

[8] Robert J. Sampson & Stephen W. Raudenbush. "Disorder in Urban Neighborhoods – Does it Lead to Crime?" National Institute of Justice, 2002. http://www.ncjrs.org/pdffiles1/nij/186049.pdf.

[9] Robert Garcia and Aubry White. "Healthy Parks, Schools and Communities: Mapping Green Access and Equity for the Los Angeles Region." 2006, p 3.

[10] Roger Lancaster. "Recreation, Park, and Open Space Standards and Guidelines." National Recreation and Park Association (NRPA), 1990.

[11] The LEED for Neighborhood Development rating system completed its pilot period in the Fall of 2009. A collaboration between USGBC, the Congress for the New Urbanism and the Natural Resources Defense Council, LEED-ND will begin registering new projects in 2010. To achieve a LEED-ND point for 'Access to Public Spaces,' developments must "locate and/or design project such that a civic or passive-use space, such as a square, park, paseo or plaza, at least 1/6 acre in area, lies within a 1/4 mile walk distance of 90% of planned and existing dwelling units and business entrances." See "LEED 2009 for Neighborhood Development Rating System." Neighborhood Pattern & Design, Credit 9: Access to Public Spaces. http://www.usgbc.org/DisplayPage.aspx?CMSPageID=148#6.

[12] Seattle Parks and Recreation Plan 2000. Distribution Guidelines for Park & Recreation Facilities, May 2000. http://www.seattle.gov/parks/Publications/Development/Plan2000.pdf.

[13] "Best Practice Guidance: Guide to preparing Open Space Strategies." Mayor of London, March 2004. http://www.london.gov.uk/mayor/strategies/sds/open_space.jsp.

[14] "Getting Greener: On The Path To Sustainability." City of Ottawa. https://ottawa.ca/residents/environment/city_hall/getgreen/green_guide_en.pdf.

[15] Recreation and Open Space Element Project Timeline. San Francisco Planning Department. http://openspace.sfplanning.org/#timeline. Despite the goals established by this timeline, as of December 2009 a final draft was not complete. This is primarily due to a lack of funding arising from the current financial crisis.

[16] Draft Recreation and Open Space Element. San Francisco, May 2009. http://openspace.sfplanning.org/docs/Recreation_and_Open_Space_Element.pdf.

[17] A number of our interviewees, including representatives of the Department of Parks and Recreation and the Planning Department at the Manhattan Borough President's Office, discouraged weighting indicators and encouraged prioritization of the different elements based on local needs.

[18] "City Environmental Quality Review Technical Manual." Mayor's Office of Environmental Coordination. October 2001, p 3D-1.

[19] CEQR provides further recommendations for breaking areas into active and passive open space. For instance: "esplanades are typically 50 percent active , 50 percent passive, whereas greenways are typically more active than esplanades; beaches can be considered 20 to 40 percent active and 60 to 80 percent passive…" and so on. Because it is not feasible for NY4P or neighborhood volunteers to collect this type of data, the Open Space Index does not entertain this depth of detail.

[20] In a departure from the CEQR definition of Active Open Space, the Open Space Index categorizes multi-purpose areas such as lawns and variable-use areas as passive open space. While many of these types of spaces could be used for active recreation, they are not specifically designed or designated for active play. Because of the re-appropriation of lawns and multi-use areas to passive space, NY4P adjusted the breakdown of open space to 1 acre of active space per 1,000 residents and 1.5 acres of passive space per 1000 residents. The aggregate open space ratio, 2.5 acres per 1,000 people, remains the same as the CEQR goal. While many cities have open space goals similar to the Index's 2.5 acres/1,000 residents, very few plans have broken the open space out into active and passive standards. Because there are no applicable models, NY4P has approximated its breakdown of 1 acre of active space and 1.5 acres of passive space per 1,000 residents based on various other variables and methodologies within the Open Space Index.

[21] Distribution Guidelines for Park & Recreation Facilities: Children's Play Areas. Seattle Parks and Recreation Plan 2000, May 2000, p 48. http://www.seattle.gov/parks/Publications/Development/Plan2000.pdf.

[22] Guide to Preparing Open Space Strategies. Greater London Authority, March 2004, p 37. In this Guide, the goals for accessibility to children's play areas is sourced to the National Playing Fields Association.

[23] Draft Recreation and Open Space Element. San Francisco, May 2009, http://openspace.sfplanning.org/docs/Recreation_and_Open_Space_Element.pdf.

[24] PlaNYC, The City of New York, 2007.

[25] PlaNYC: Schoolyards to Playgrounds. The City of New York, 2007. http://www.nycgovparks.org/sub_about/planyc/playgrounds.html.

[26] In December 2009, the original PlaNYC goal of converting 290 schoolyards to playgrounds was reduced to 266 sites. The reduction was due to the City's fiscal situation. See Mireya Navarro, "24 Sites Cut From City Plan for 290 Parks," The New York Times, December 16, 2009.

[27] Roger Lancaster. "Recreation, Park, and Open Space Standards and Guidelines," NRPA, 1990.

[28] Roger Lancaster. "Recreation, Park, and Open Space Standards and Guidelines," NRPA, 1990.

[29] DPR Indoor Recreation Centers charge the following fee schedule:

	Seniors (55 +)	**Adults (18 +)**	**Youth (under 18)**
Recreation Centers without indoor pools	$10 per year	$50 per year	Free
Recreation Centers with indoor pools	$10 per year	$75 per year	Free

Standard membership includes scheduled access to gym, pool, and other facilities for one year. Instructor-led courses such as aerobics, martial arts, music, or yoga may require additional session fees. http://nycgovparks.org/facilities/recreationcenters?utm_source=newsletter&utm_medium=email&utm_campaign=BeFitNYC+Open+House+Week+Jan+11-16.

[30] NY4P research found no existing targets for Recreation Centers in other cities. The Index's target relies on NRPA's goals for tracks and pools, two elements often located within recreation centers. The NRPA standard for each is 1/20,000 residents. See, Roger Lancaster. "Recreation, Park, and Open Space Standards and Guidelines," NRPA, 1990.

[31] New York City Department of Parks and Recreation. http://www.nycgovparks.org/facilities/recreationcenters.

[32] "City Environmental Quality Review Technical Manual." Mayor's Office of Environmental Coordination, October 2001, p 3D-1.

[33] New York City Department of City Planning. http://www.nyc.gov/html/dcp/html/priv/priv.shtml.

[34] New York City Department of Transportation. http://www.nyc.gov/html/dot/html/sidewalks/publicplaza_round1.shtml.

[35] U.S. Census Bureau, 2005-2007 American Community Survey.

[36] New York City Population Projections by Age/Sex & Borough 2000-2030. New York City Department of City Planning, Population Division. December 2006. http://www.nyc.gov/html/dcp/pdf/census/projections_report.pdf.

[37] Natural Areas Initiative. New Yorkers for Parks and New York City Audubon. 2004

[38] "Safeguarding the Environment: The Economic Benefits of Open Space." The Trust for Public Land, May 21, 1999.

[39] Jerold S. Kayden, the New York City Department of City Planning and the Municipal Art Society of New York. *Privately Owned Public Space: The New York City Experience*, 2000.

[40] Diane Englander. "Community Gardens – A Resource at Risk," The Trust for Public Land, 2001.

[41] Ioan Voicu and Vicki Been. "The Effect of Community Gardens on Neighboring Property Values," Furman Center for Real Estate and Urban Policy, New York University and New York University School of Law, August 2006, p 2.

[42] Lenny Librizzi. "Comprehensive Plans, Zoning Regulations, Open Space Policies and Goals Concerning Community Gardens and Open Green Space from the Cities of Seattle, Berkley, Boston, and Chicago." March 20, 1999.

[43] City of Seattle Legislative Information Service. Resolution Number: 30194, adopted June 19, 2000. http://clerk.ci.seattle.wa.us/~scripts/nph-brs.exe?s1=&s2=&s3=30194&s4=&Sect4=AND&l=20&Sect1=IMAGE&Sect2=THESON&Sect3=PLURON&Sect5=RESN1&Sect6=HITOFF&d=RESN&p=1&u=/~public/resn1.htm&r=1&f=G

[44] "City Environmental Quality Review Technical Manual." Mayor's Office of Environmental Coordination, October 2001, pp 3D-7 to 3D-13.

[45] "Building Transit-Friendly Communities, a Design and Development Strategy." Regional Plan Association, 1997.

[46] LEED for Neighborhood Development Rating System. Neighborhood Pattern and Design, NPD Credits 9 and 10, http://www.usgbc.org/ShowFile.aspx?DocumentID=5275. Specifically, LEED-ND issues credit when 90% of residents live within a 1/4 mile of an open space of at least 1/6 acre and, further, that there be at least one acre of active open space within 1/2 mile walking distance of all residences.

[47] "Getting Greener: On The Path To Sustainability." City of Ottawa. https://ottawa.ca/residents/environment/city_hall/getgreen/green_guide_en.pdf.

[48] Seattle Parks and Recreation Plan 2000. p 54. http://www.seattle.gov/parks/Publications/Development/Plan2000.pdf.

[49] Draft Recreation and Open Space Element of the General Plan of the City and County of San Francisco. San Francisco Planning Department, May 2009.

[50] The urban heat island effect occurs when city air temperatures are greater than nearby suburban and rural temperatures due to the lack of natural, vegetated surfaces and the overwhelming presence of surfaces that absorb heat at a higher rate. Studies have shown that New York City summertime temperatures average 7.2°F (4°C) warmer

than surrounding suburban and rural areas. Vegetation can play a significant role in cooling these areas. This increased air temperature can be mitigated through a variety of strategies including urban forestry and green roofs. A study conducted by Hunter College and the NASA Goddard Institute for Space Studies showed that the urban forest is the most effective way to minimize the urban heat island effect. "In addition to reduced energy demand, mitigation of New York City's heat island could improve air quality and public health, as well as reduce the city's contribution to greenhouse gas emissions". See Cynthia Rosenzweig, Solecki, W., Parshall, L., Gaffin, S., Lynn, B., Goldberg, R., Cox, J., and Hodges, S. "Mitigating New York City's Heat island with Urban Forestry, Living Roofs, and Light Surfaces." A report to the New York State Energy Research and Development Authority. Columbia University Center for Climate Systems Research and Hunter College Department of Geography, 2006.

[51] In 2007, a study conducted by the US Forest Service estimated the annual benefits of New York City street trees to be $121.9 million. After taking the maintenance costs of the trees into consideration, the study estimated the net annual benefits to be $100.2 million. The benefits included stormwater management advantages, energy savings, air quality improvement, carbon dioxide reduction and increases in property values. See Peper, P., G. McPherson, J. Simpson, S. Gardner, K. Vargas, and Q. Xiao. "New York City, New York: Municipal Forest Resource Analysis." Center for Urban Forest Research, USDA Forest Service and Department of Land, Air and Water Resources, University of California-Davis, April 2007.

[52] Sustainable Annapolis Community Action Plan, p 13. http://www.annapolis.gov/upload/images/government/depts/environ/Sustainable%20Annapolis%20-%20Community%20Action%20Plan.pdf.

[53] Tree Baltimore. http://www.baltimorecity.gov/Government/AgenciesDepartments/RecreationandParks/TreeBaltimore.aspx.

[54] Grow Boston Greener. http://www.growbostongreener.org/.

[55] Million Trees LA. http://www.milliontreesla.org/mtabout8.htm.

[56] Urban Forestry Plan, City of Roanoke. http://www.roanokeva.gov/85256A8D0062AF37/CurrentBaseLink/8D2C6A9F1AD34DE5852576040062E281/$File/Urban%20Forestry%20Plan.pdf.

[57] City of Seattle Urban Forest Management Plan, p 51. http://www.seattle.gov/environment/documents/Final_UFMP.pdf.

[58] City of Vancouver, Urban Forestry Management Plan, Executive Summary, p. 37. http://www.cityofvancouver.us/parks-recreation/parks_trails/urban_forestry/docs/UFMP_final-web.pdf.

[59] J. Morgan Grove, Jarlath O'Neil-Dunne, Keith Pelletier, David Nowak, Jeff Walkton. "A Report on New York City's Present and Possible Urban Tree Canopy." Prepared by USDA Forest Service at the request of NYC DPR, July 2006. http://www.nrs.fs.fed.us/nyc/local-resources/downloads/Grove_UTC_NYC_FINAL.pdf.

[60] J. Morgan Grove, Jarlath O'Neil-Dunne, Keith Pelletier, David Nowak, Jeff Walkton. "A Report on New York City's Present and Possible Urban Tree Canopy." Table 6: Existing, Possible, and Relative UTC by Neighborhood, p 20, July 2006. http://www.nrs.fs.fed.us/nyc/local-resources/downloads/Grove_UTC_NYC_FINAL.pdf.

[61] Riverkeeper Sewage and Combined Sewage Overflows. http://www.riverkeeper.org/campaigns/stop-polluters/cso/.

[62] The Open Space Index does not break artificial turf fields out into a unique permeability category because of the variety of turf systems used in city parks and the lack of public research on turf permeability.

[63] K.Y. Liu and A. Baskaran. "Using Garden Roof Systems to Achieve Sustainable Building Envelopes." *National Research Council of Canada*, 2005, p 4.

[64] Both Chicago and Toronto have passed legislation that mandates the installation of green roofs on new buildings and provides financial incentives for the installation. In August 2008, the New York state legislature created a pilot program offering a tax abatement to encourage construction and maintenance of green roofs in New York City. Building owners who install vegetation on at least half of their rooftop space may receive $4.50 per square foot of green roof, up to $100,000, in a one-time property tax credit. The abatement amount equals about 25% of the cost typically associated with a green roof's materials, labor, installation and design. For New York state law text, see Real Property Tax, Article 4, Title 4-B (499-AAA - 499-GGG) GREEN ROOF TAX ABATEMENT FOR CERTAIN PROPERTIES IN A CITY OF ONE MILLION OR MORE PERSONS. http://public.leginfo.state.ny.us/menugetf.cgi?COMMONQUERY=LAWS.

[65] "Reducing the Urban Area Heat Island Effect: Artificial Turf vs. Natural Grass and Other Greenery in Urban Areas." TPI Turf News. May-June 2007, p 100.

[66] Ibid.

[67] Outfield and foul ground sizes vary. See Grady L. Miller, "Baseball Field Layout and Construction," Environmental Horticulture Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL, Publication date: June 2001, Revised: July 2001. http://edis.ifas.ufl.edu/EP092.

[68] Ibid.

[69] ProDunkHoops is a company that provides equipment for basketball courts as well as information on basketball courts themselves. Information provided on the website is taken from the NBA, NCAA and NFHS. http://www.produnkhoops.com/support/guides/basketball_courts/court_dimensions.html.

[70] Fielder's Choice designs and constructs athletic fields nationally. See http://www.fielderschoiceinc.com/Field-Construction-Services/Bocce-Courts/.

[71] For Professional & NCAA football field dimensions see the Sports-Know-How website. http://www.sportsknowhow.com/pops/football-field-ncaa.html.

[72] International Handball Federation. http://www.ihf.info/front_content.php?idcat=85.

[73] Sports-Know-How. http://www.sportsknowhow.com/hockey/dimensions/hockey-rink-dimensions.html.

[74] For NCAA Standards for Swimming and Diving Pools, see the Recreonics website. http://www.recreonics.com/fyi/ncaa_standards.htm.

[75] Ibid.

[76] Ibid.

[77] See the Sports-Know-How website. http://www.sportsknowhow.com/soccer/dimensions/soccer-dimensions.html.

[78] Ibid.

[79] See the Sports-Know-How website. http://www.sportsknowhow.com/tennis/dimensions/tennis-court-dimensions.html.

[80] See the Sports-Know-How website. http://www.sportsknowhow.com/pops/volleyball-court.html.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